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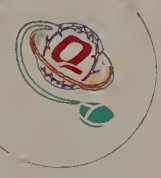

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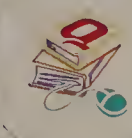

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PC World Magazine
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Prosignia Desktop 330

PROSIGNIA NOTEBOOK 162

- Mobile Intel® Pentium® II Processor 366 MHz
- 6.4 GB SMART Hard Drive[1]
- 64 MB SDRAM (expandable to 192 MB)
- 14.1" CTFT (1024 x 768) Display
- 24X Max CD-ROM[2]
- Compaq V.90 Data/Fax Modem[5]
- Compaq PremierSound™
- Integrated AC Adapter; 2 Li-Ion Batteries
- Microsoft® Windows® 98
- Microsoft Office 97 Small Business Edition®
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- 3-year Worldwide Limited Warranty[4]

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- Additional Li-Ion Battery: $129
- Compaq Global Case: $89

PROSIGNIA NOTEBOOK 161

- Mobile Intel Pentium II Processor 333 MHz
- 4.0 GB SMART Hard Drive[1]
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- 14.1" CTFT (1024 x 768) Display
- 24X Max CD-ROM[2]
- Compaq V.90 Data/Fax Modem[5]
- Compaq PremierSound
- Integrated AC Adapter; 1 Li-Ion Battery
- Microsoft Windows 98
- Microsoft Office 97 Small Business Edition
- Free[3] Trial of Compaq Online Services
- 3-year Worldwide Limited Warranty[4]

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- Compaq Value Case: $49

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- MultiBay™ Zip® Drive Upg
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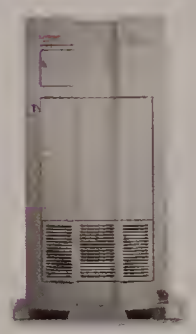

PROSIGNIA SERVER 740

- Intel Pentium II Processor 450 MHz
- Dual Processor Capable
- 64 MB SDRAM (expandable to 1 GB)
- 9.1 GB Wide-Ultra SCSI Hard Drive[1]
- Max. Internal Storage of 54.6 GB[1]
- 8 Bays: 4 Removable, 4 Hard Drive
- 32X Max CD-ROM[2]
- 10/100 TX UTP NIC
- Novell® Netware 4.2 (5 users)
- Pre-Failure Warranty:[6] Memory, Drives, Processors
- 3-year Limited Warranty[4]

$3289 Purchase price*
$112 Monthly lease price[7]

Customize with these options:

- Upgrade to Intel Pentium III Processor 500 MHz: $349
- Add 9.1 GB Hard Drive:[1] $599
- Microsoft Windows NT® Operating System also available

PROSIGNIA SERVER 720

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- 64 MB SDRAM (expandable to 384 MB)
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- Max. Internal Storage of 27.3 GB[1]
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$1869 Purchase price*
$64 Monthly lease price[7]

Customize with these options:

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Intel Pentium III Processor 500/100 MHz
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Compaq S900 19" Monitor (18" viewable)
6X/32X DVD-ROM Drive
Compaq 56K V.90 PCI Modem
Altec Lansing ACS44 speakers w/subwoofer
STB/nVIDIA TNTv, 3D AGP 16 MB
Microsoft Windows 98
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$88 Monthly lease price[7]

Customize with these options:

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Upgrade to Microsoft Office Professional: $199
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Compaq 10/100 Network Controller
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STB/nVIDIA TNTv, 3D AGP 16 MB
Microsoft Windows 98
Microsoft Office 97 Small Business Edition
Free Trial of Compaq Online Services
3-year Limited Warranty

$2039 Purchase price*
$70 Monthly lease price[7]

Customize with these options:

Upgrade to S900 19" Monitor (18" viewable): $200
Upgrade to Microsoft Office Professional: $199
Upgrade to Windows NT: $99

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9.1 GB Ultra ATA Hard Drive
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32X Max CD-ROM
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Microsoft Office 97 Small Business Edition
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3-year Limited Warranty

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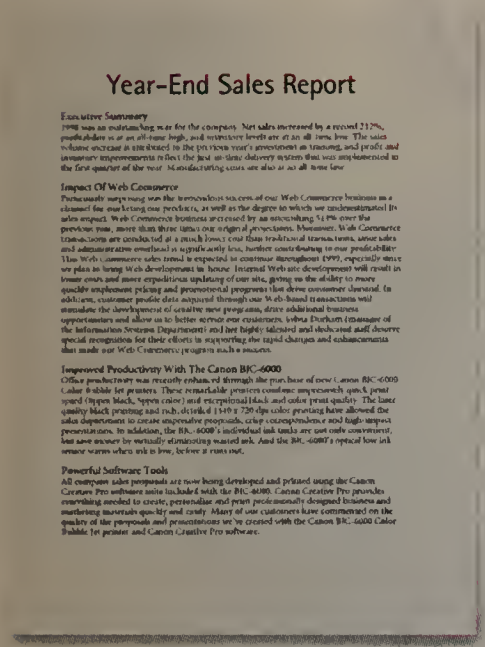

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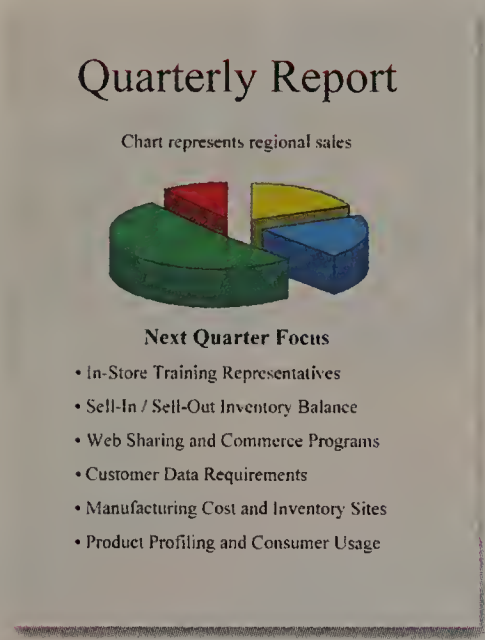

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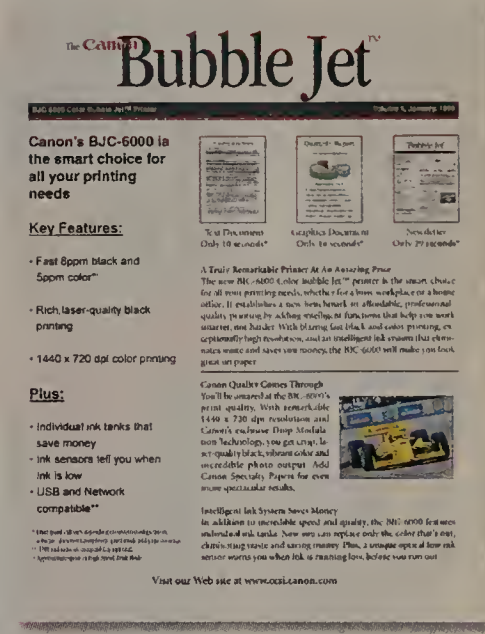

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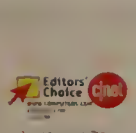

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168 **FIND IT ON THE WEB**

HOW-TO The best thing about the Web? Information. The worst thing? Chaos. If you sometimes feel that your search for truth online is a hopeless quest, here's help: tips, tricks, and tools for uncovering the latest news, data on people, product information, reference sources, even hardware and software tech support.

195 **NO-BRAINER HOME HOOKUPS**

REVIEW New, easy-to-connect home networking kits—whether wireless or running over phone or electric lines—make sharing printers, files, and Web access a snap. We put seven setups to the test and come up with two Best Buys guaranteed to make any small office happier and more productive.

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ICONS: JEFFREY PELO

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57 WEB SCAM! HOW ONE ISP TOOK THE MONEY AND RAN
An exclusive *PC World* investigation uncovered shady ISPs with Web site offers too good to be true.

60 WINDOWS, WINDOWS, WINDOWS! THREE NEW VERSIONS IN 12 MONTHS
Which Windows? The question gets more complicated as Redmond pumps out betas for Win 98 SE and Win 2000 and plans another OS based on Windows 9*x*.

64 NEW CELERON-466: LOTS OF PC FOR LITTLE MONEY
online A $1448 Celeron-466 PC serves up PIII-450 power for less. But if graphics matter to you, beware the 810 chip set option.

68 LINUX GETS WINDOWS MAKEOVER
New versions from Caldera and Red Hat are easier to install and eerily Windows-like.

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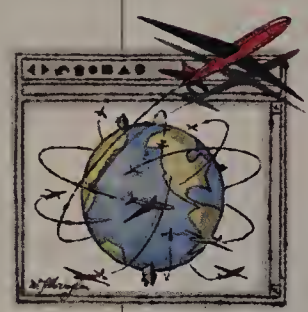

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NEW PRODUCTS

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TOP 100

235 CELERON ACCELERATES
TOP 100 online Celeron sells! The first wave of Celeron-400s (as well as two Celeron-433s) yields five Budget and three Home chart makers this month.

238 POWER DESKTOPS
TOP 20 It's a Best Buy sweep as 500-MHz Pentium IIIs, led by Dell's brand-new OptiPlex GX1p 500, lock up the top five slots on the chart.

244 BUDGET DESKTOPS
TOP 20 This month's new chart-toppers are fast, cheap, and in full control: Quantex's Celeron-400 is among the fastest budget PCs we've ever tested, while CyberMax's entry is the cheapest Celeron-400 yet.

256 NOTEBOOKS
TOP 10 Notebook prices have stabilized, but you can still find bargains. Case in point: Gateway's all-around fine Solo 2500SE, our new number two budget laptop.

262 HOME PCs
TOP 10 Who says you need a Pentium II if you really want to be sitting pretty? This month, comparably configured Celeron- and AMD-based systems from Micron, Gateway, and IBM grab budget chart share from PII incumbents.

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TOP 10 Sony's fine but pricey new model and a vivid LG entry wrapped in an unusually designed case debut on the chart.

265 COLOR PRINTERS
TOP 10 An inexpensive new ink jet from HP disappoints, leaving the top spots on the small-business/home chart to arch-rivals Epson and Lexmark.

271 GRAPHICS BOARDS
TOP 10 Creative Labs rules! The top PCI and AGP boards are fast, superior 3D cards from this graphics board titan.

273 MODEMS
TOP 10 Soon they'll be paying you! The top internal V.90 modem, a feature-packed MaxTech model, retails for just $38.

HERE'S HOW

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online Troubleshoot and repair your Windows Registry, turn off Task Scheduler permanently.

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online Make Outlook 98 work across partitions, teach NT to read FAT32, download an NT defragmenter.

288 ANSWER LINE
online Share one modem between two PCs, test your system for Y2K readiness, go online to find resellers of discontinued software.

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Share text among multiple documents with a macro; make Word's editing screen easier on the eyes; create start-up switches in Word 6, 7, and 97.

296 SPREADSHEETS
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online

340 FULL DISCLOSURE
Incredible hardware developments are now so common that they no longer surprise us.

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PCW ONLINE

TOP 10 GRAPHICS BOARDS FOR GAMERS

REVIEW If you want to be a Fighter Squadron ace, you need a top-flight graphics board. Check out PC World Online's brand-new comparison of the best boards for gaming.

www.pcworld.com/jun99/gaming_boards

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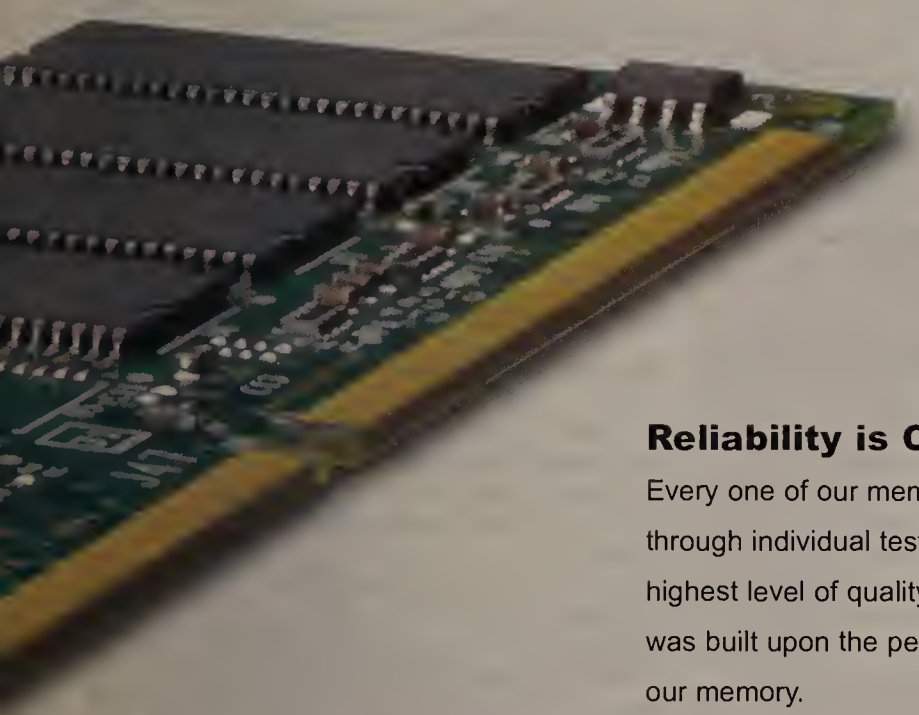

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Magnum Pro Plus P200	$163.38	NA

Gateway	Crucial	Kingston
G6-300	$94.99	164.00
P5-133	$161.48	247.00
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IBM	Crucial	Kingston
Aptiva (2140) Model L5H	$94.99	157.00
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PC 300PL (6892-50U)	$94.99	154.00

HP	Crucial	Kingston
Pavilion 3260	$94.99	178.00
BRIO Advanced Business Models 8338	$94.99	178.00
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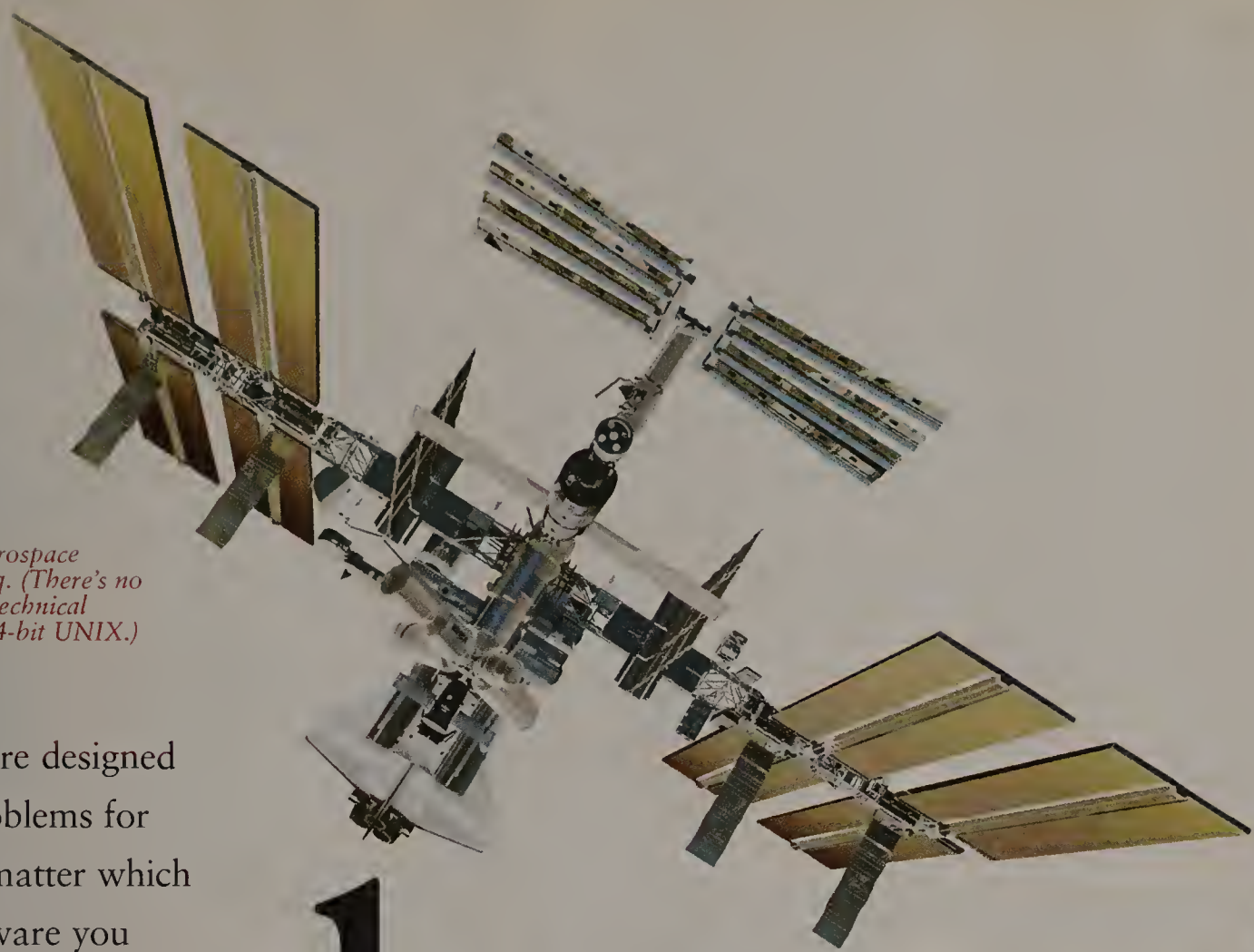

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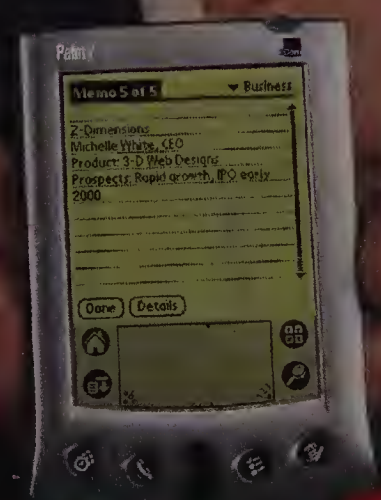

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Kill Floppies, Not Time

BY PC RECKONING, the 3.5-inch floppy disk drive is as ancient as the Dead Sea Scrolls. It's not much better for data interchange. The little 1.44-megabyte floppies came in with IBM's ill-fated PS/2 systems in 1987. You could get a PS/2 with microfloppy, DOS 3.30, a 10-MHz 80286 processor, 1MB of memory, and a 20MB hard drive, all for a mere $3595. Of course, adding a monitor and a graphics card drove the total cost considerably higher.

It takes both hard work and reckless disregard for your company's financial health to spend $3595 on a PC today. For example, you could get a Dell Dimension XPS T500 with Windows 98, 500-MHz Pentium III CPU, 256MB of memory, 25.5GB hard drive, 19-inch monitor, 16MB TNT graphics card, network interface, fancy speakers, deluxe sound card, and 250MB Zip drive. About the only thing that hasn't changed since PS/2 days is the 1.44MB floppy.

One thing's **certain**: The industry's **excuses** for staying with 1.44MB floppies **won't fit** on a 1.44MB floppy.

An industry-standard replacement for the 1.44MB drive is long overdue. The most likely candidates can be found in Stan Miastkowski's "Floppy Killers" on page 143. Stan points out that 1.44MB drives live on because there's one built in to every new PC. Computer makers must be persuaded to build in a removable media drive with much higher capacity.

Like the 1.44MB floppy, the replacement has to be bootable so it can help you cope with emergencies. It would be a huge plus if the removable media drive that becomes the new standard could read 1.44MB floppies, offering a seamless transition from old to new. In fact, three of the alternative drives—SuperDisk, Caleb, and HiFD—can read the old floppies. They offer the smallest advances in capacity, but also the lowest prices. And a leap in capacity from 1.44MB to 120MB or 200MB would make standard removable storage a more convenient alternative to downloads that keep going and going and going, and then sometimes suffer time-outs and have to be restarted.

Even if the new standard drive can't read the old disks, it can succeed. If it's there, it's there. People can put up with maintaining both an old drive for backward compatibility and a new drive for acceptable capacity. With or without backward compatibility, the industry can establish a new standard by building the new drives into every system. One thing's certain: The industry's excuses for staying with 1.44MB floppies won't fit on a 1.44MB floppy.

STILL SEARCHING

THE SAME PC whose floppy holds almost nothing looks out on the Internet, which holds just about everything. Somewhere...if only you can find it by wading through the mostly irrelevant information served up by your favorite search engine. True, wading through a mass of results beats jumping aimlessly from Web site to Web site and from page to page looking for everything yourself. But if search engines performed their difficult task more proficiently—in the sense of returning the information you want at the top of the list much of the time—there wouldn't be so many search engines, and we wouldn't all be using so many of them.

In "Find It on the Web," Matt Lake and Dylan Tweney undertake the most perplexing search of all: the quest for the best search tool. They examine all the major search tools in depth, detailing their strengths and weaknesses, and offer tips for improving your results. Then they venture beyond the search engines and look at a variety of other major information sources on the Web, from peer-to-peer discussion groups to sites devoted to specific kinds of information.

GET IT WHILE IT'S FREE

THE ECONOMICS OF the Web are enough to make your head spin, fall off, roll down the street, and crush all conventional wisdom in its path. Companies charge nothing for information and services. You pay nothing. Yet everyone with an Internet company is getting rich from stock appreciation, and your mutual fund holdings have soared in value, too. The whole wealth-through-freeloading-and-giveaways movement leaves many people with a queasy feeling that there must be a catch. There is, and Harry McCracken and Glenn McDonald have put their finger on it in "Best Free Stuff Online."

The catch? Many free services waste your time. You encounter one delay after another in pursuit of your goals. Your time is not free, nor is there much of it available to waste.

That's where McCracken and McDonald come to the rescue. They've tried one freebie after another to find out which ones do the best job. Whether the task at hand is e-mail, calendaring, Web hosting, or community building, they've sought fast and satisfying sites and come back with the best of the Net. Their advice will save you time and help you keep your head on your shoulders.

Phil Lemmons is editorial director of PC World. ■

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IOMEGA CRITIQUES CLIK REVIEW

IN YOUR REVIEW of the Iomega Clik Drive [*New Products*, April], the author says he could accomplish the job of transferring digital images to a PC in one less step using a flash memory reader. However, the device he mentions requires a laptop computer. I would rather not carry a laptop just to dump my digital images.

The review also states that the Clik Drive cannot coexist with any other parallel port device. Iomega does state on the box that parallel port sharing is not recommended, but this is a limitation of almost all parallel port devices.

Finally, the review says that running the Clik Drive on Windows CE handheld devices with the card slot interface requires AC power, so that it is unsuitable for use on the road. Actually the Clik Drive is battery powered, and the battery is good for 30 minutes of continuous use.

Jonathan Graham, Iomega

Author's response: Parallel port limitations are indeed a common drawback, but usually (as with Iomega's Zip drive) a printer can coexist with the device; my complaint was that the Clik did not allow this. I regret not mentioning the rechargeable battery—although 30 minutes of battery life is extremely brief.

—Michael S. Lasky

ROBBED—OR JUST DUMB?

SO YOU THINK that America Online is at fault because of its willingness to accept checking account information without written authorization [*On Your Side*, April]? But what about the responsibility of the person who gave the information to the friend who started the fake account? And why in the world would you ever give out your personal billing information so freely?

America Online is not to blame. It is graciously letting thousands of people sign up using their checking information, and it makes your responsibility very clear when you open your account.

Jay McPhearson, Oklahoma City

INTEL INSIDE—BUT NOT TOO MUCH

I WILL NOT buy an Intel chip with a Processor Serial Number—not now, not ever [*Top of the News*, April]. I don't care what assurances Intel or the government offers about enhanced security and protected e-commerce.

Such a PSN puts me at the mercy of anyone who wants to track what I do and where I go online. I will never again log on to the Internet if I even suspect I am under such scrutiny.

The benefits of PSNs should be handled with software, not hardware, and made available only to those who want it. Leave my hardware anonymous.

Robert E. Butts, South Bend, Indiana

MICROSOFT FORCE-FEEDING II

WALTER KNOTH [*Letters*, April] writes that before he installed Picture It, he had to install Internet Explorer first. In my ▶

HOT BUTTON

Stinging 'CPU Scams' Stirs Up Hornet's Nest

IN RESPONSE TO your article "CPU Scams" [April]: I have been a computer dealer since 1982 and I can honestly say that I have never sold a counterfeit CPU, for one very good reason—I buy products exclusively from reliable vendors. My customers have never had to question the authenticity of my products (hardware or software) because I look at them very carefully myself, first.

I take great offense at the author's suggestion that consumers buy only brand names from major corporations, and that buying from anyone else invites problems.

Denver L. Corley
Fayetteville, West Virginia

I WAS APPALLED that your article would accuse local computer shops of being more likely to sell stolen, counterfeit, or re-marked CPUs than large vendors like Compaq or Dell, or chains like CompUSA.

As a local computer store owner, I buy from the same distributor as the large companies. We provide the civilities that consumers want but don't get from the large firms, such as short lines, same-day turnaround on repairs, and no rebate hassles. I think you are doing a great disservice to local computer stores.

Jeff Holder, Escondido, California

THANK YOU for the great article on remarked CPUs. I had just ordered a high-end AMD K6-2, or so I thought. When it arrived, I noticed that it looked generic. After reading your article, I ran some tests on this processor and discovered that it was actually an overclocked K5. The small company I had ordered it from said it didn't know the CPU was re-marked, but it promptly replaced the unit.

Chris Fromm
Granite Falls, Minnesota

Editor's response: We overstated the case when we said "your chances of encountering the gray market are good" at a swap meet, online auction, little-known mail-order company, or local computer shop. Based upon our own shopping experiences and dozens of letters from readers, a more accurate statement would have been, "While there are many trustworthy small vendors, customers have an increased chance of encountering gray market goods when they shop at those venues, compared with giant national vendors and superstores."

—Steve Fox, Editor

ILLUSTRATION: ROBERT NEUBECKER

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experience, all Microsoft products do this. If you work hard enough, you can install them without IE. The best bet may be just to avoid Microsoft products!

Dan Schulz, Chicago

MY PC IS LIKE A RED, RED ROLLS

IF I SEE THAT trite analogy comparing computers and cars [*Letters*, April] one more time, I think I'm gonna scream.

Next to the software and hardware interconnections of a computer, the ▶

CORRECTIONS AND CLARIFICATIONS

MAY'S "Setting Up Shop Online" incorrectly identified Twice As Nice (www.twiceasnice-plus.com) as a Web site that sells doll-making products; it sells baby products. A business with a slightly different URL (www.twiceas-nice.com) sells doll-making products.

May's "19-Inch Monitors: Flat-Out Fabulous" should have listed IBM's toll-free support hours as 24 and Princeton's as 11.

April's *New Products* review of Simply Postage should have said that the starter kit costs $50 to lease, not buy, and that the $18 monthly fee includes one free monthly download of postage.

April's *Top 20 Power Desktops* should have said that the RAM sockets on the Dell OptiPlex GX1p 450 (the number one Best Buy) are, in fact, accessible—you press a latch and swing the hinged power supply out of the way. Also, we should have stated that the number four Dell Dimension XPS T500 does indeed have a standard 3.5-inch floppy drive.

April's "A Scanner for All Reasons" should have said that the Epson Perfection 636 does not include a transparency adapter (it is a $99 option).

In April's *Bugs and Fixes*, the correct URL for Quicken 99 Release 3 is www.intuit.com/support/quicken/index/ndxw_8_updates.html. Also, May's column should have said that the size of a Microsoft Outlook patch was 5MB.

In April's *Word Processing*, the boxed tip "Nudge Graphics in Word" should have said to hold down the <Ctrl> key, not the <Alt> key.

February's *New Products* review of LexisNexis Universe stated that not all major magazines are available on the service, but should have added that it offers a broad array of sources, including 1700 magazines.

PC World regrets the errors.

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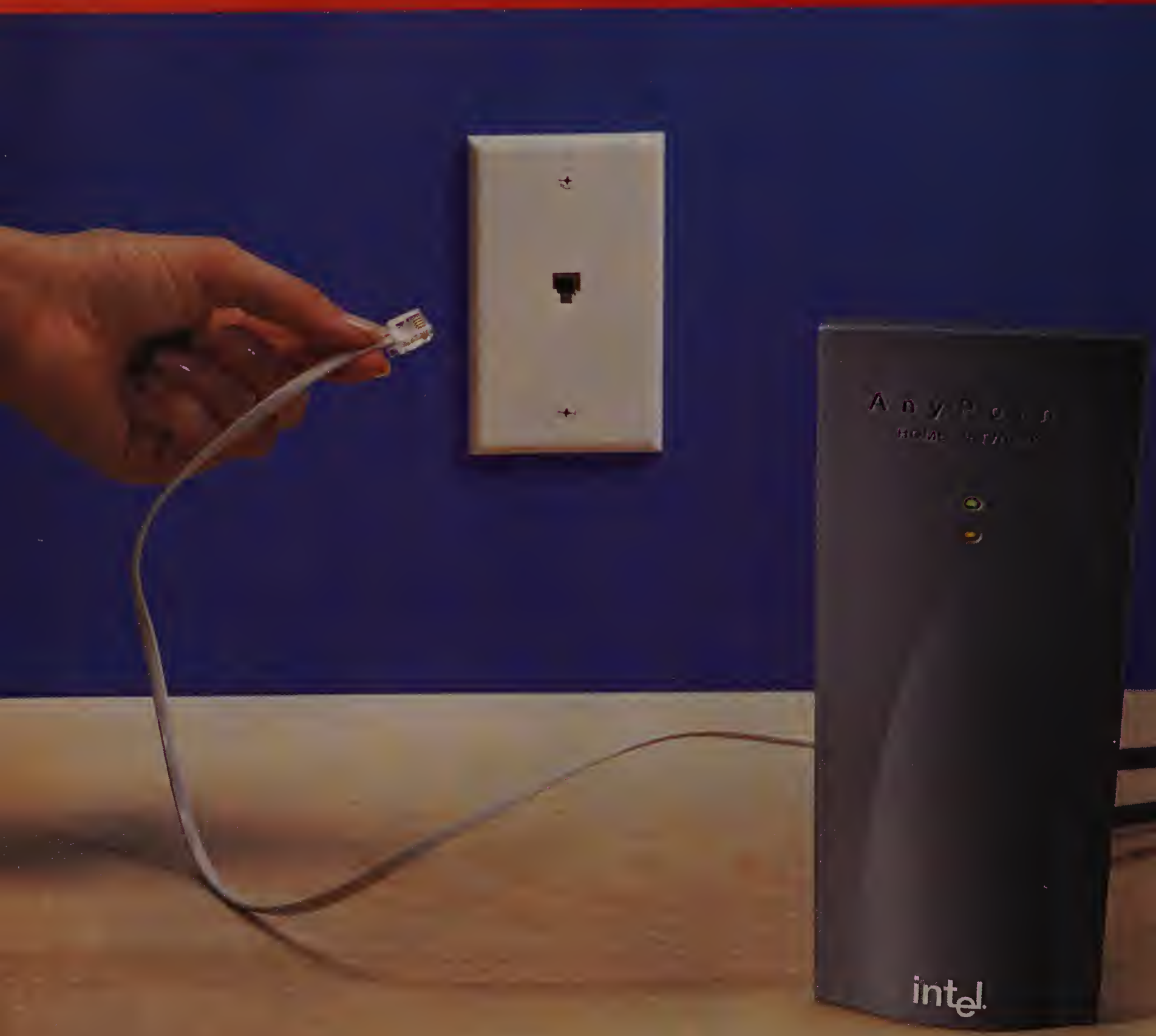

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ALSO NEXT MONTH

▶**The PC World Top 100:** The best Power and Budget Desktops, Notebooks, Home PCs, Printers, Monitors, Graphics Boards, and Modems.

▶**Here's How:** Windows Tips on opening a single file type in almost any app, Answer Line on cleaning up debris left by deleted apps, Upgrade Guide on upgrading your RAM.

PC WORLD

mechanical relationships of a car seem more akin to an animated Tinkertoy.

If a comparison must be made, the PC resembles a simple life form. In that context, Lincoln Spector's comment that "every application messes up your system in its own special way" [*Answer Line*, January] is not so remarkable. Exercise is good for you, but it also has hazards. Food is necessary, but allergies can occur. Medicine has risks. If Mom Nature can't iron out all these kinks after a few billion years, what hope do we have in the couple score or so years that computers have been around?

So, please, no more of these simplistic analogies about cars vs. computers.

Hal Toomer, San Diego

SCANNING TINTS IN PRINT

REGARDING "A Scanner for All Reasons" [April]: On page 170, two pictures were shown—one scanned by the Umax Astra 2400S, and the other by the HP ScanJet 6200C. The caption for the two photographs claims that "HP looks washed out." But anyone who compared the photos with the original shown on page 166 could see the HP photo was much closer to the original in color intensity and brightness. How are your comments justified?

Boyle Ke, via the Internet

Editor's response: The HP ScanJet 6200C displayed washed-out color on screen. Unfortunately, the screen shot we took displayed a contrary look in our final print magazine due to color gain on the press. **–Grace Aquino**

CHECK IT OUT–ONLINE

YOUR MAGAZINE keeps those of us who aren't computer whizzes subscribing because of the hints columns, and you simply can't repeat them too often. It would be nice to have them published in a tear-out fashion or compiled on a CD-ROM and indexed.

Jim Belanger
Hollis, New Hampshire

Editor's response: All of our tips are available on our Web site (www.pcworld.com/heres_how), where you may search them by topic or by issue. **–Yael Li-Ron**

PC World *welcomes your letters to the editor. See page 14 for contact information.* ■

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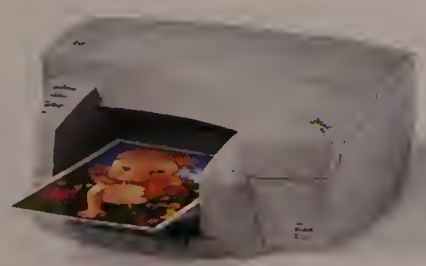

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What to Do When You Pick a Lemon

You don't have to get stuck with a problem-plagued PC. Here's how to get what you paid for.

CHIRAG KARIA COULDN'T HAVE been more excited when he bought his first home computer in February 1997. The Palo Alto, California, attorney scoped out his needs, researched the options, and settled on an $1800 PC from Quantex Microsystems, a mail-order vendor based in Somerset, New Jersey.

But Karia's delight soon turned to frustration. His CD-ROM drive stopped working, his computer began emitting a high-pitched whine, and he kept getting error messages that required him to reboot his system. Despite three motherboard replacements, new RAM, and a new processor, his PC continued to behave erratically.

Karia demanded that Quantex fix the PC. When the company tried and failed, he asked for a refund. But after many attempts to get reimbursed, he asked his credit card company to intercede. He now has his refund and is beginning a new hunt for a new home PC. Though he's glad to be rid of his faulty machine, he feels cheated by the experience. "What really upset me was not that they gave me a lemon," he says, "but their attitude after it happened—I called so many times [and sent back the PC], and it came back with the same problems."

According to Nat Terrizzi, service and support manager for Quantex, Karia's experience was unusual. Terrizzi says Quantex was willing to replace Karia's PC "and restore his faith in the company." An order for a replacement was in the works, in fact, when Quantex learned that Karia's credit card company had charged back the price of the original unit. Asked why Quantex didn't refund Karia's money on its own, Terrizzi said, "We don't want to lose customers. We consider refunds the last resort."

THE UNLUCKY FEW

THOUGH KARIA'S experience is not normal, *PC World* gets letters every month from consumers who've been to hell and back trying to get problems fixed in their new PCs. In the first few months of this year, we received letters from owners of "lemon" PCs from Compaq, Hewlett-Packard, and IBM, among others.

Consumers who discover their misfortune within 30 days of buying PCs usually can return them for a refund. But what if you don't realize there's a problem before the first 30 days have passed? Are you stuck getting repair after repair? Or does your warranty provide other options?

To answer these questions, I took a crash course in warranty law from experts and buyers' advocates. Once I got past the legal mumbo-jumbo, I found that consumers have more options than companies typically let on—whether or not the warranty spells them out.

WARRANTY LAW 101

ALL CONSUMER GOODS are covered under federal warranty law. Some states have enacted additional laws to afford consumers even greater protection. And various product-specific statutes—known popularly as lemon laws—govern cars, boats, wheelchairs, and a few other types of goods. Though their details differ, lemon laws' most important functions are ▶

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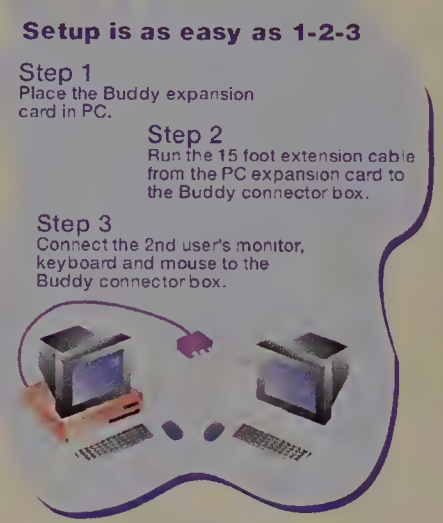

Consider this:

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to define just what constitutes a lemon and to spell out the steps that consumers must follow to exercise their rights.

The warranty that covers your PC is an *express warranty*. It tells you how long the product is covered, whom to contact when a problem arises, and typically, how to get an item repaired or replaced. But your protections extend far beyond the written warranty. Under the Uniform Commercial Code, consumer goods also carry an *implied warranty*, certifying that if a product still malfunctions after a "reasonable number" of repairs, the consumer is entitled to a replacement or refund. In most cases, the implied warranty is limited to the duration of the express warranty.

> Your protections extend far beyond the written warranty. Consumer goods also carry an implied warranty.

Some PC makers (including, ironically, Quantex) discuss this option in their warranty. But the right is yours "whether or not it's stated in the warranty," says Richard Alexander, author of The Consumer Law Page (www.consumerlawpage.com) and founder of the Alexander Law Firm in San Jose, California. But as Chirag Karia's experience illustrates, being entitled to a refund is one thing, while obtaining one can be quite another.

GETTING YOUR DUE

WHEN YOUR PC fails while under warranty, call the vendor and follow its rules for fixing the problem. Failing to go through proper channels can diminish your rights. In most cases, the company's first attempt to repair the machine will resolve the problem. But what if the repair doesn't work? Can you request a refund or replacement?

Though the courts have never defined what a "reasonable number" of repair attempts is, it's safe to say *reasonable* means more than one. Compaq, Dell, and IBM all said they handle these "exceptions" case by case. Only Quantex would quantify the term. The company generally considers replacing a PC when the same component breaks down more than twice or when a single PC undergoes more than two repairs for different components.

Attorneys I spoke with said that after three or four failed repair attempts (or three or more discrete problems within the warranty period), buyers should be entitled to a refund or replacement.

But PC companies rarely volunteer this solution. You'll have to demand it. Send the company a detailed report of the problems you've had and the steps you've taken. Say whether you want a refund or a replacement. And note that you're making the request pursuant to the product's implied warranty.

Companies would rather replace a PC than lose a customer. If such an offer is made, cut your losses and accept the new PC—even if what you really want is a refund. If a company refuses your request, take the case to small-claims court. Most consumers avoid this option, but Alexander and other consumer-affairs lawyers say it's not as complicated as you might think. If you do choose this route, read *Everybody's Guide to Small Claims Court*, from Nolo Press (www.nolo.com).

If you follow the proper PC repair procedures, you stand a good chance of winning, says Evan Johnson, an attorney in the Montgomery County, Maryland, Division of Consumer Affairs. Though the court is not responsible for collecting the judgment, Johnson says most companies don't want judgments against them outstanding. If the company won't pay, file forms with the court to have a marshal serve it with papers.

MAKING LEMONADE

CONSUMERS CAN'T control whether the PC they purchase proves to be a lemon or keeps working properly long after the warranty has expired. But what happens *after* you get a lemon is up to you.

Think you've got a lemon? E-mail us at consumerwatch@pcworld.com. Roberta Furger is a PC World *contributing editor and author of* Does Jane Compute? Preserving Our Daughters' Place in the Cyber Revolution *(Warner Books, 1998).* ■

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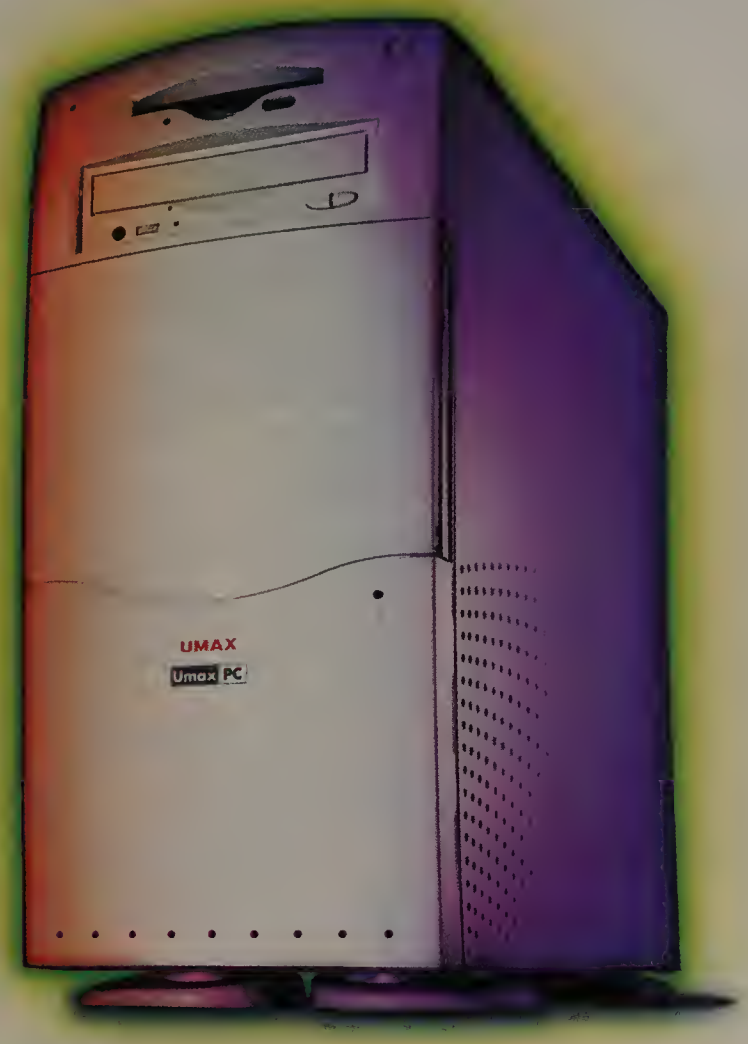

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Do-It-Yourself Fixes Risk Your Warranty

IT WAS A HANDYMAN'S nightmare. David Jablon of Pompano Beach, Florida, had bought a Hewlett-Packard Vectra PC at the urging of his friend, Dr. Lester Shalloway of Miami. Both men felt able to do minor upgrades, so within a year they replaced the video card. But when the part died and they called HP's support line, "the rep implied that opening the case would nullify the warranty," Shalloway recalls. The two men were shocked.

Does popping the hood void the warranty? Only if you screw up. HP owners can add third-party hardware such as RAM, modems, and audio or video cards—as long as they do the job right. "But if they damage the PC while upgrading it, the repair costs will not be covered," says Dominick Robertson, consumer products manager in HP's customer support division. Basically, if you break the part, you buy the repair. According to HP, the warranty on that part is cancelled temporarily, until you cough up your dollars to get it fixed. (The guarantee covering all other components remains intact.)

We wondered how HP determines whether damage to a part resulted from a user's upgrade attempt or from a preexisting problem. Robertson explains that a technician walks you through diagnostic tests over the phone, then determines on a case-by-case basis whether the problem is your responsibility. If it isn't, HP (or the third-party manufacturer of a non-HP component) springs for the repairs. Otherwise, you pay for those immediate repairs *and* for any subsequent repairs stemming from the original damage.

Hewlett-Packard is not alone in enforcing such a warranty-cancellation policy. Compaq, IBM, and Sony allow users to tinker with the innards of their desktops without voiding the warranty—until they make a mistake. Our rule of thumb: If you aren't comfortable performing computer upgrades or maintenance yourself, drag your system to an authorized service center—or you might be kissing free warranty repairs good-bye.

Heads Up...

GOT INSOMNIA? Try calling **Gateway's** technical support. Reader Eugene Cornell e-mailed that he fell asleep while waiting on hold. Gateway acknowledges that the company developed a backlog when it switched from its old ISP to a new one hosting gateway.net. At press time the company claims that response time has improved... "**Diamond's** rebate is a lump of coal," wrote Vince Flagg of Redding, California. We forwarded many complaints about missing rebates to the multimedia card company. "We're fully aware of the delay and have taken steps to fix the situation," says Mary Medeiros, company spokesperson, adding that the problem stems from a switch in fulfillment centers. You can contact VP/CIO Bernie Miller at berniem@diamondmm.com for help... **Bigfoot**, provider of e-mail products, sent Michael Spector of Watsonville, California, unwanted offers. "I received two unsolicited e-mails—one about videos and the other about flowers," he wrote. David Finkel, Bigfoot's business development director, confirms that the company sent the promos. "We only e-mailed members who had not opted out of third-party marketing messages at registration," says Finkel. If you're still getting spammed, click on the link in the message to avoid future ads.

LETTER OF THE MONTH

THE INTERNAL FLOPPY drive on my WinBook FX laptop died after a year, while I was working overseas. The company told me that I had to replace the drive but that it had none available. I called back after a month and WinBook still had none in stock. Five months later, I'm still waiting. I requested a replacement laptop but got no response. I finally had to buy an external floppy drive for $249. Can you help?

—*Barbara Ann Klein, New York*

***PC World* responds:** We contacted WinBook, and the company promised to expedite sending the replacement drive. A WinBook rep apologized to Klein, explaining, "We stopped using one of our FX manufacturing partners and had difficulty getting some repair parts on a timely basis." To her delight, Klein received the new floppy drive two days after WinBook got our e-mail. Aside from minor installation problems, Klein reports, the drive works fine—though she's still out the $249. ■

GOTTEN A RAW DEAL?

Or a great one? E-mail us the details at onyourside@pcworld.com. We will investigate complaints and publish items of the broadest interest. Aoife McEvoy is an associate editor for PC World.

ILLUSTRATION: RICK SEALOCK; ICONS: JEFFREY PELO

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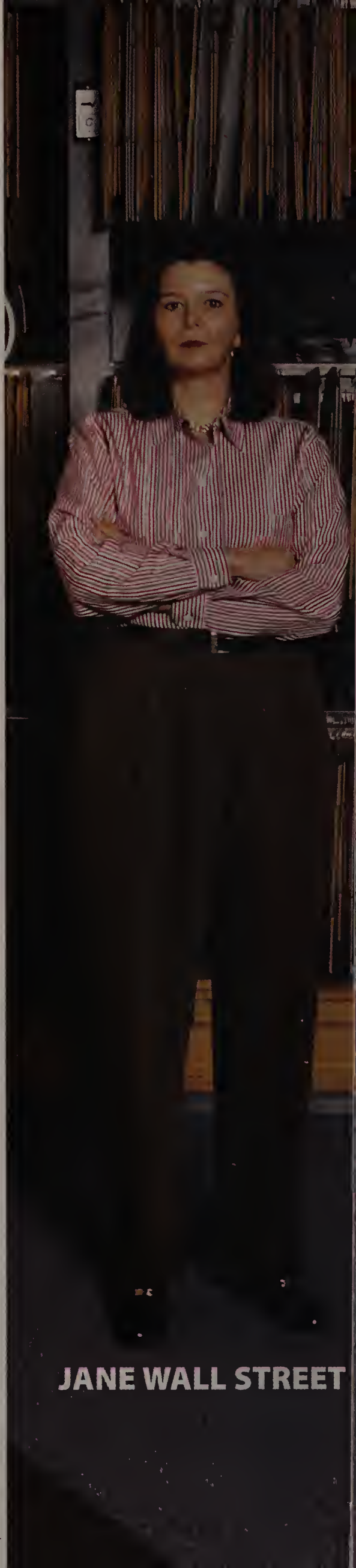

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Beating the High Price of Printer Ink

PROBLEM *The cost of buying new cartridges for your color ink jet printer is breaking the bank.*

SOLUTION *Use a refill kit, which can cut your printer's ink costs to less than a penny per page.*

PHOTOGRAPH: ROBERT CARDIN

NOTHING TAKES THE shine off a new ink jet printer faster than paying for replacement ink cartridges. With each cartridge costing between $18 and $40 and producing at most a few hundred pages (versus the thousands of pages that a laser toner cartridge yields), it's easy to spend more on ink during your first year of ownership than you paid for the printer itself. Suddenly that $199 color ink jet doesn't look like such a great bargain.

Just ask San Francisco middle-school substitute teacher Patricia Skidmore. The busy Skidmore family was spending more than $100 a month on ink cartridges for its three ink jets. "We use our printers a lot for work and school," she explains. "My daughter prints weekly lesson plans and color handouts for the class she teaches, and my husband and I print about 100 pages a week for work projects. My son regularly prints drafts of his 400-page master's thesis. We generate anywhere from a few pages a day to as many as 700."

Skidmore slashed her ink costs radically by purchasing refill kits from Repeat-O-Type, one of several third-party companies that sell kits for ink jet printers from Canon, Epson, Hewlett-Packard, Lexmark, and other companies. The savings vary depending on the printer, but a typical kit costs about the same as a name-brand ink cartridge while offering about five times the amount of ink, lowering the cost of a new ink supply to under $4. Using kits, Skidmore estimates, she's saved $325 so far. Recently she decided to step up her discount by purchasing Repeat-O-Type ink in bulk. "I bought a one-pint, $27 bottle of black ink that I figure will give me over 70 refills," she says. "That's 39 cents per refill versus the $18 I used to pay for a cartridge at the local office supplies store."

POTENTIAL PITFALLS

REFILLING INK cartridges can reduce an ink jet's cost per page to a fraction of a penny, but the process isn't hazard-free. For one thing, it can be messy—typically, you puncture a hole in an empty cartridge, then squirt it full of ink using a syringe included with the kit. You'll want to wear gloves and cover your work surface with newspapers before you start.

And printer companies, which pocket more profit from ink cartridges than from the printers themselves, predictably frown on the use of refill kits. Vendors maintain that the kits can't match the print quality provided by a fresh cartridge containing the manufacturer's own ink. Worse, they say that refills could damage your printer by leaking ink. If you're a cautious person, even a slight possibility of poor print quality or hardware damage might be enough to scare you away from refills. But Patricia Skidmore says she's seen no difference in the quality of either her black-text or color documents. Nor have her refilled cartridges ever spilled ink.

Furthermore, some printer companies have led consumers to believe that using refill kits will void printer warranties, but Hewlett-Packard, Epson, and other vendors with ▶

whom we spoke say that simply isn't true. A company may legally charge for any printer repairs caused by a leaky refilled cartridge, but it must honor the warranty for other types of repairs.

Damage from third-party ink leakage is unlikely as long as you follow the kit's instructions, says Jim Lundy, a research director at research firm The Gartner Group. You can minimize your risk by buying refills from a company such as Repeat-O-Type that promises to repair your printer if it's damaged by one of its products.

KIT ALTERNATIVES

IN ADDITION TO marketing ink refill kits, third-party vendors also sell compatible cartridges for some printer models (mostly Canon and Epson units) that snap into place just like the name-brand variety but cost considerably less. For instance, Repeat-O-Type's black ink cartridge for Epson's Stylus Color 400 ink jet printer sells for $9, less than half what you'd pay for Epson's official cartridge. Compatible cartridges should provide at least the same level of quality that refill kits do, says The Gartner Group's Lundy. However, he adds, "It takes a while to design a good compatible ink, so if you've just bought a new printer, I would recommend waiting a few months until companies have had some time to fine-tune their products."

You can also save money simply by printing in draft or economy mode—you'll use 50 percent less ink. The print quality of these pages will suffer, but the resulting documents make suitable copies for filing, say, or informal distribution. You can also conserve ink by avoiding unneeded graphics. For example, instead of printing a Web page—banner ads and all—cut and paste the text into a word processing document. Finally, if you don't need color, print in gray scale. You can make black the default color in all your documents by setting the preference globally in your printer's driver software.

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Renewable Resources
800/734-6548; www.renewableresources.com

Repeat-O-Type Manufacturing
800/288-3330; www.repeatotype.com

Even if you elect not to use refill kits and alternative cartridges, the preceding tips can help you cut your printing costs. But to get the most dramatic savings, go with third-party ink. "I will *never* go back to buying individual cartridges," says Skidmore. "[Purchasing Repeat-O-Type ink in bulk] is almost like getting ink for free."

Carla Thornton is a contributing editor for PC World. *If you're having trouble resolving a PC-related hardware or software problem, we'd like to hear from you. See page 14 for contact information.* ■

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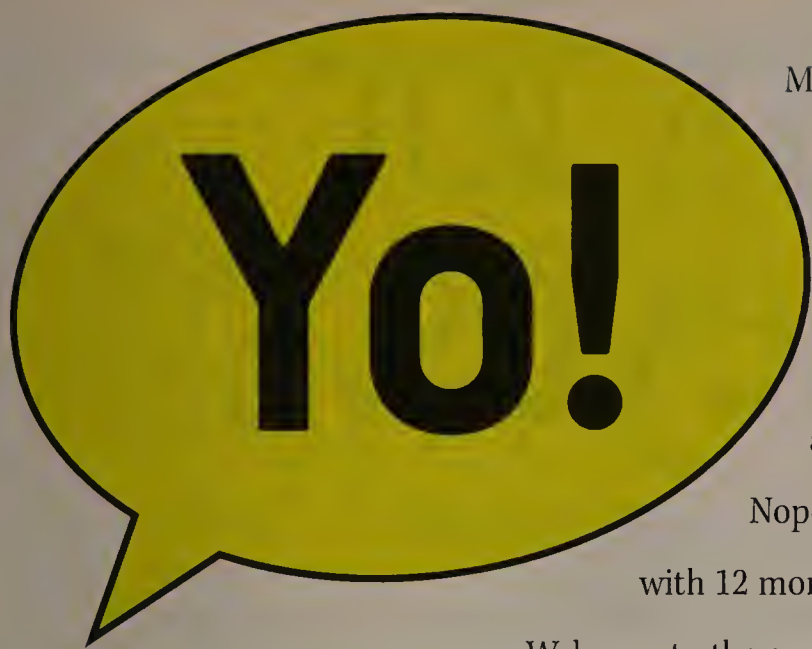

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Cable Modems: Nice Net If You Can Get It

A FEW MONTHS AGO I had a chance to actually measure a nanosecond. It's exactly how long it took me to decide to get a cable modem. Finally, I thought, I can rip out my old modem, tell Pac Bell to take a flying leap (and grab its ISDN line on the way out), and start accessing the Internet the way God and Bill Gates intended.

That was back in January 1998, when Charter Communications promised to install cable modem access in my home town of Altadena, California. Ten months later, Charter delivered. (Hey, for a cable company, that's timely service.)

Now, after six months of use, I can say cable was worth the wait. At least, that's what I tell myself on the good days.

PAIN AND CABLE

CABLE MODEM ACCESS is awesome for lots of reasons. First, I'm always online, an exalted position for an Internet junkie. Having cable modem access is like having a long extension cord connected to the ISP. Unlike with a regular modem, you don't need a phone line, so you never have to dial up or hear busy signals. My e-mail program checks for messages every minute, and I respond instantly, impressing the dickens out of my editor.

Cable is also incredibly fast—when it works the way it's supposed to (more on that in a sec). In Altadena, data blasts its way in at 256 kilobits per second, twice my old ISDN's 128-kbps speed. With a cable modem, I can download a 5MB file in less than 3 minutes and clutter my entire drive in an evening. (Unfortunately, upload speed is relatively poky at 56 kbps.)

But whether you can actually get the service is hit and miss (mostly miss), and pricing and performance vary widely among the dozens of cable companies that offer Net access. (For details, see "Bandwidth on Demand," March, www.pcworld.com/mar99/cableaccess.) In Pasadena, for instance, about $50 per month buys me Charter's 256-kbps/56-kbps cable hookup and EarthLink's Internet service. Around $75 gets me 512 kbps down and 128 kbps up. Yet for only $50, a cable company across town provides a *much* faster connection—1.5 mbps for receiving and 300 kbps for sending. (I tried to talk Judy into moving, and she told me what I could do with the cable.)

> Finally I can **start accessing** the **Internet** the way God and **Bill Gates** intended.

Installation cost $169, but I didn't have to do a thing. Two technicians laid cable under the house, stuck a network card in my PC, and configured the system. Finally, they hooked up my computer to an external modem.

What ticks me off about cable modem access, though, is that the connection can become sluggish—sometimes for a day or more at a time—for no apparent reason. I'll often get download speeds 30 percent lower than advertised; other users in my area have suffered even slower transmission rates. On bad days, even connecting to a fast server at 2 in the morning makes no real difference. And from reading messages in the comp.dcom.modems.cable newsgroup, I'd wager that's a universal gripe.

EarthLink claims the problem is Net congestion. My take? With cable access, you're sharing bandwidth with dozens, maybe hundreds, of your neighbors. If too many of them download files at the same time, traffic slows to a crawl for everybody.

And bandwidth isn't all that you're sharing. Like it or not, when you use cable, you're on a local area network. I encountered four strangers when I opened my Network Neighborhood. They couldn't do any harm—I had 'File and Print Sharing' unchecked in my Network settings, effectively locking them out. But the discovery was still disconcerting. Charter has since fixed this problem, but you may not be so lucky with your service. My advice: If you're using cable with a stand-alone PC, your best protection is to turn sharing off.

SPREADING THE WORD

STILL ON THE FENCE about cable modems? Then log on (slowly) to the Net and take in some sites. Start at Sam's Cable Modem Trials (www.teleport.com/~samc/cable5.html) and the Cable Modem Help Page at www.cablemodemhelp.com. Also visit home.tampabay.rr.com/philip1 for tips on how to tweak a cable modem.

Despite the hassles, cable is the way I'm surfing from now on. Then again, I hear Pac Bell plans to offer Digital Subscriber Line service in my town. Stay tuned.

Contributing Editor Steve Bass is a licensed marriage and family therapist and the president of the Pasadena IBM Users Group. *See page 14 for contact information.* ■

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IE 5: Chip off the old block? ◆ Microsoft has your number ◆ Acrobat 4.0 is A-OK

IE 5 Bug-Free? Don't Believe It

IT WAS ONLY a matter of time—one week, to be precise—before a bug turned up in Microsoft's latest browser. Just seven days after Microsoft released Internet Explorer 5, security researcher Juan Carlos Cuartango announced that the browser has a serious security flaw that could allow Web sites to read the contents of your clipboard while you're interacting with Web pages. Meanwhile, bug sleuth George Guninski discovered three other flaws that could allow Web hackers to access files on your system.

When these vulnerabilities were first reported, a Microsoft employee posting to a Windows NT security mailing list confirmed their existence and said fixes were on the way. Microsoft has acknowledged these issues and advises security-conscious users to change default security configurations to eliminate the weakness. As with most browser security flaws, no attacks exploiting these are known to have occurred. Nevertheless, Microsoft says it is working on an update to prevent Web servers from accessing client clipboard and file data. But now that the cat's out of the bag, you should take steps to protect your system.

To close the security holes in your copy of IE 5, choose *Tools•Internet Options•Security,* click the *Custom Level* button, and scroll down to 'Active scripting' and 'Allow paste operations via script settings'. Set both to *Disable,* and then click *OK* to finish.

You may encounter yet another problem if you send or receive messages that are digitally signed or encrypted using IE 5's version of the Outlook Express mail and news reader. Before accepting messages, Outlook Express consults a third-party certificate authority to confirm that the digital certificate used in signing and encrypting is still valid. The lists of revoked certificates that these authorities maintain can be as large as 500KB, so the process can seem interminable, and you might mistakenly believe that the program has crashed. Fortunately, you can turn off revocation checking: Select *Tools•Options•Security,* click the *Advanced* button, and select *Never* in the Revocation Checking area. Click *OK* twice to finish.

ICON: JEFFREY PELO

Windows NT 4.0 SP5, Already

MICROSOFT IS RELEASING Service Pack 5 (which fixes various minor and obscure bugs) hard on the heels of the previous update. In contrast, Service Pack 4 took nearly a year to appear. Microsoft says its new strategy, based on customer feedback, is to issue updates more frequently and to include only rock-solid bug fixes, omitting new features and drivers. Like earlier updates, SP5 is cumulative. It incorporates previous service packs, and it fixes problems that cropped up in SP4, along with other assorted bugs. At press time, SP5 was not yet posted, but it should be available by the time you read this. Visit www.microsoft.com/windows/downloads/winntw.asp.

IN BRIEF

Remove Windows 98 and Office 97 IDs

YOU MAY have heard about the feature in Windows 98 and Office 97 that lets Microsoft upload users' personal data and unique ID information (see May's *Up Front*, www.pcworld.com/may99/upfront). Microsoft claims it didn't know about these surreptitious uploads, and says it uses the ID number only for legitimate customer-service tasks. Uh-huh.

To get the patch that prevents Windows 98's Registration Wizard from uploading your PC's configuration data, choose *Start•Windows Update* or visit www.windowsupdate.microsoft.com. For the Office 97 fix, download a patch from officeupdate.microsoft.com/downloadDetails/Off97uip.htm. To remove the ID from Office documents, you can download the utility at officeupdate.microsoft.com/downloadDetails/pf_setup.htm.

No Trojan Horse in Adobe Acrobat

IF YOU USE McAfee's VirusScan 4.*x* and have Adobe's new Acrobat Reader 4.0 installed on your system, you may have had an unnecessary security scare. After downloading virus definition file 4.0.4017, VirusScan would mistakenly report that the main Acrobat Reader executable file, ar40.exe, contained the NetBus trojan horse. Though ostensibly an aboveboard remote-control (and spying) program, NetBus is often exploited as a trojan horse. According to the Data Fellows antivirus Web site (www.europe.datafellows.com/v-descs/netbus.htm), hackers have used NetBus to steal data and delete files from remote users' PCs over the Internet. Luckily, the NetBus scare was a false alarm. An Adobe spokesperson says that Acrobat is virus-free and that updating VirusScan to the 4.0.4019 virus definition file will prevent that false report. For the details from Network Associates, visit www.avertlabs.com/public/datafiles/valerts/vinfo/ar40-info.asp.

Files from this article are available on PC World Online at www.fileworld.com/magazine. Scott Spanbauer is a contributing editor for PC World. ■

BUGGED?

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TOP OF THE NEWS

ISPs @ Risk

Merger mania: When big ISPs buy out little ISPs, it's great for Wall Street but can be **tough on consumers.** Here's **how to survive** when your provider gets snatched up.

BY YARDENA ARAR

CONSUMER ALERT

MINDSPRING acquires Netcom. Cable & Wireless purchases MCI One. RCN buys Erols. Welcome to the ISP mating game, in which big business wins and customers sometimes lose. Last year, more than 160 of an estimated 6000 ISPs worldwide were acquired, and the pace is picking up. Most of these were small local or regional providers, but national services were also purchased, raising the stakes considerably: The five biggest deals affected nearly 1.5 million customers.

What can go wrong when ISPs merge? Take your pick: poor connections, billing difficulties, changed e-mail addresses and Web site URLs. When PC World Online asked readers whose ISPs had been bought to discuss their experiences, we received dozens of complaints citing these problems and many others. While it's impossible to tell what percentage of customers walk away mad when their ISP is bought, it's clear that changes aren't always for the better.

BAD PERFORMANCE, WORSE SUPPORT

MANY READERS complained bitterly about connection problems following an ISP buyout, citing persistent busy signals, sudden disconnections in the middle of file downloads, and decreases in connection speed of 50 percent or more. Harold Gunn of Bridgeton, New Jersey, reports that his connection speed with Sprynet plummeted from 28.8 kbps to as low as 12 kbps after MindSpring acquired Sprynet from America Online. In addition, Sprynet's previously announced plans to upgrade to 56-kbps service by the end of 1998 were shelved. The service had improved by early spring, but Gunn was still waiting for the inception of 56-kbps service.

Customer service woes annoyed users even more. The MCI account of Chicago attorney Mark Bauer was sold to Cable & Wireless USA in one of last year's largest deals. Bauer encountered constant busy signals when he tried to connect to the service and faced similar problems when he sought tech support. When he finally got through, he ▶

ILLUSTRATIONS: JAMES YANG; ICONS: JEFFREY PELO

JUST IN

Next-Generation Video Cards

GAMERS WILL BE particularly interested in cards based on the new NVidia TNT2 chip set, slated for use in products from Creative Labs, Diamond, Elsa, and Hercules. Diamond's TNT2 card, the Viper V770, will ship in May. In late April gamers can expect cards based on 3dfx Interactive's new VooDoo3 3500 chip, followed in May by cards based on S3's Savage4 and Matrox's G400 chip sets. For mainstream business folk, Intel will roll out the Intel 752 chip set with 2D and 3D capabilities; expect the first systems with 752-based cards to arrive in June.

Online Privacy Bill

MASSACHUSETTS Representative Edward Markey, the highest-ranking Democrat on the House Telecommunications, Trade, and Consumer Protection Subcommittee, plans to introduce a bill designed to protect consumers' online privacy in early May. The bill is expected to include a Privacy Bill of Rights stating that individuals have a right to know what kind of information a Web site is gathering about them and what the site intends to do with that information, as well as the right to prevent sites from collecting it. Penalties (if any) have not been determined. ▶

GET UP-TO-THE-MINUTE NEWS, including hot game demos, the latest reviews, and productivity shareware, at PC World Online. Point your browser to www.pcworld.com/pcwtoday.

ISP Takeover Survivor

Name: Mark Bauer
Job: Antitrust attorney, Chicago
Original ISP: MCI One
Acquired by: Cable & Wireless USA
What happened: Bauer frequently received busy signals when he dialed in at peak hours. When he was able to connect, performance fell to 13.9 kbps on his 56-kbps modem. He also had difficulty reaching customer service. When he complained, a supervisor promised to call him back but never followed up.
What he did: Bauer switched to MindSpring and is now happy.

says, he waited on hold for 18 minutes before getting a customer service rep. "They said, 'It's a problem on your computer,'" Bauer recalls. "How can a busy signal be a problem on my computer?" He managed to reach a supervisor, who promised to look into the problem and call him back. When that call didn't come, Bauer switched to MindSpring.

Bauer was among a large contingent of former MCI customers who contacted PC World Online about their experiences—good and bad—following the buyout. But evidently, Cable & Wireless itself isn't too pleased about the transaction: It recently sued MCI, alleging (among other charges) that MCI failed to turn over promised customer service and support resources.

That lawsuit might help explain complaints about Cable & Wireless's billing. To complete the sale rapidly and satisfy regulatory requirements for its merger with WorldCom, MCI agreed to continue billing its former customers until C&W could set up its own billing system. The lawsuit accuses MCI of failing to do that adequately, and some customer complaints we received seem to support the allegation.

> Changing your **e-mail address and Web site** can be as disruptive as changing your **office address.**

Valerie Bowen of San Antonio didn't receive her first Cable & Wireless bill until several months after the takeover. The bill was a shocker: $141, instead of the $20 per month she'd been paying for unlimited access. Cable & Wireless told her it was merely continuing a new billing plan implemented by MCI just before it sold out. Bowen says she was never notified of the change. She wound up paying nearly $300 for her three-month tenure with C&W—and that was after negotiating a credit for that initial $141 bill. Bowen has since switched to a small local provider and says she's willing to accept her new ISP's slightly slower connection speeds in exchange for a stable, flat-rate billing plan.

Cable & Wireless declined to comment on the MCI lawsuit, but senior vice president Art Medici acknowledges that "we were going through some growing pains." He says C&W plans to spend $670 million to upgrade its network and is committed to improving the current level of service.

SORRY, WRONG ADDRESS

IF YOU'VE ever moved your office, you know the aggravation and expense that accompany an address change. You have to notify customers, revamp business cards and stationery, and deal with any number of unexpected problems. Changing ISPs can be equally disruptive. Ask Michael Ortiz. When CTA, his local service provider in Victorville, California, was sold to Mountain States Communications, he lost his Web site URL and his e-mail address. As vice president of an export and offshore manufacturing business, Ortiz depends heavily on Web exposure to attract overseas customers: Before the changeover, his site generated about five to ten sales leads a day. After the acquisition, search engine links that used to funnel customers to him no longer worked. And since it took three months to reestablish the site with a new URL, Ortiz may have lost something like 500 leads overall.

Other customers have experienced stranger disruptions. Donna Barron, who manages the Web site for Hollywood, Florida–based Arco Computer Products, still shudders when recounting what ensued after Cybergate acquired her company's ISP, Netrunner. Customers said they couldn't find certain pages she knew she had posted. It turned out that Barron now had two sites: the new one on Cybergate, where she was posting updated material; and the old one on Netrunner—now inaccessible to her—where search engines continued to direct customers. It took weeks to straighten out the mess. Barron lost several days wrestling with the problem, and believes it may have cost Arco tens of thousands of dollars in business.

Analysts say most ISPs that acquire other services attempt to purchase the old domain name so customers can keep their existing e-mail addresses and URLs. Sometimes, however, the seller wants to keep the domain name, perhaps for

PHOTOGRAPH: JEFFREY KEVIN HORAN; RIGHT: GARY MOSS

an entirely different business. In other instances, the buyer simply may not be willing to spend the money necessary to maintain the old domain name and service its e-mail. Either way, if your e-mail or URL rug gets jerked out from under you, you're out of luck. The two best ways to assure yourself of a reasonably permanent address are registering your own domain name and setting up a free Web-based e-mail account with an established service like Yahoo or HotMail.

CONSOLIDATION TO CONTINUE

THE URGE to merge seems to be stronger than ever. Tom Millitzer, president of New Commerce Communications, which brokers ISP acquisitions and tracks publicly reported ISP deals, says some 70 ISPs were acquired or merged in the first three months of 1999, compared to about 160 in all of 1998. From a business standpoint, bigger is better because larger ISPs can lower costs through economies of scale that are unavailable to small services.

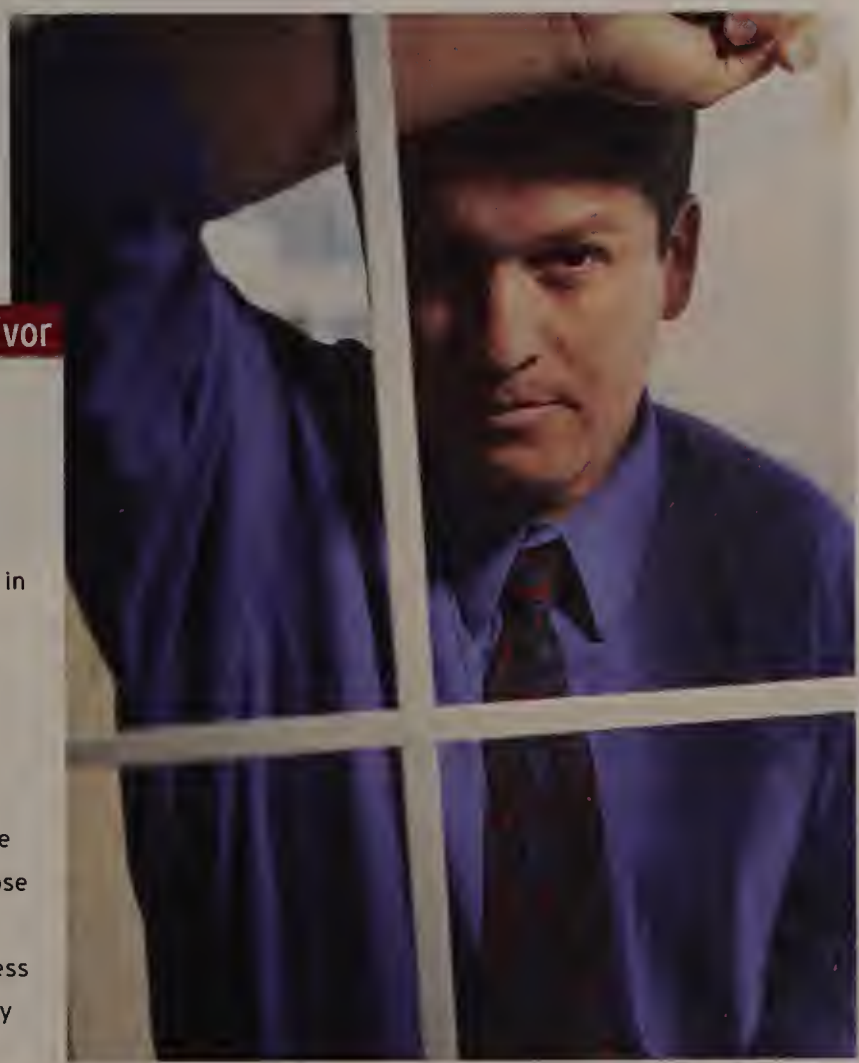
When large ISPs invest their savings in their networks, consolidation can result in improved service. In PC World Online's survey, numerous respondents—including some Cable & Wireless customers—said they were satisfied with the service from their successor ISP after their original ISP sold out. Alex Coimbre, a pharmaceutical research consultant based in Clayton, North Carolina, says that he received plenty of advance notice about the MCI–C&W changeover. He finds connecting to C&W easy and fast, and says that C&W's technical support is even better than MCI's.

The other good news is that, despite the shakeout, consumers still have plenty of choices. Even as many older ISPs are gobbled up, new ones appear. MCI and PSI will soon introduce new services, for example.

> Despite the **industry shakeout,** consumers will continue to have **plenty of choices**—at least into the near future.

Residents of most cities and suburbs still have ten or more ISPs vying for their business, according to International Data Corporation analyst Jeannette Noyes. An additional indication that competition is alive and well in the industry: The average cost of unlimited service has remained stable at about $20 a month for the past couple of years.

But continued consolidation may eventually reduce the number of providers, especially as demand increases for high-speed technologies ▶



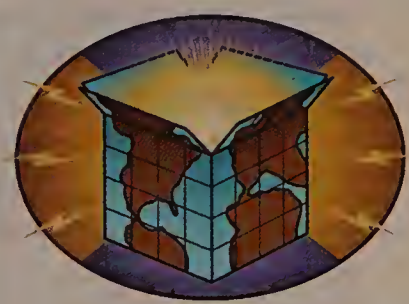
ISP Takeover Survivor

Name: Michael Ortiz
Job: Vice president, Best Idea Products, an exporter and offshore manufacturer based in Las Vegas. Ortiz telecommutes from his home in Victorville, California.
Original ISP: CTA
Acquired by: Mountain States Communications
What happened: Both his e-mail address and his company's Web site address changed, causing him to lose hundreds of business leads.
What he did: Ortiz took his business to another ISP (GTE) and eventually registered his own domain.

JUST IN

Microsoft Unwired

WIRELESS KNOWLEDGE, a joint venture of Microsoft and Qualcomm, plans to unveil services that enable travelers to use a cellular phone, pager, or palm-size PC to tap into the Exchange groupware and e-mail package for e-mail, contact information, and group scheduling. One of the first such services, Revolv, will be offered to business customers by wireless phone and paging services. Microsoft's MSN Mobile initiative is developing services that would let consumers retrieve HotMail e-mail messages, stock quotes, sports scores, traffic updates, and other selected Web-based content with a wireless device. These services are expected to be available next year.



Tidbytes

AMD to Launch Much-Awaited K7 CPU in Mid- to Late June: The K7, expected to debut at 500 MHz, is built around a new core and a 200-MHz bus based on technology developed by Digital Equipment. Most analysts expect AMD's new chip to outperform the Pentium III. **Quicken for Palms:** The $40 Pocket Quicken by Landware (800/526-3977, www.landware.com) lets you enter financial transactions such as expenses into a 3Com Palm handheld device and then transfer the data directly to Quicken 99 on your PC. The program can also transfer your account balances from Quicken 99 to Pocket Quicken, so you can take your finances on the road.

Big ISPs Get Even Bigger

BUYER	Acquisition	Customers affected
MindSpring	Netcom's ISP business	550,000
RCN	Erols	300,000
Cable & Wireless	MCI's ISP business	250,000
MindSpring	Sprynet	180,000
EarthLink	Sprint Internet Passport [1]	130,000

[1] Sprint sold its Internet Passport customer base as part of a deal in which it acquired a minority interest in EarthLink.

SOURCE: INTERNATIONAL DATA CORPORATION

such as cable and DSL, which require multimillion-dollar investments. "Mom-and-pop operations simply aren't going to be able to step up to the plate," predicts Forrester Research senior analyst Bruce Kasrel. He anticipates that small local services will have an even tougher time competing when large telecommunications companies start to bundle cable TV, telephone service, and high-speed Internet access into attractively priced service packages.

STAY OR GO?

SO WHAT SHOULD you do if your ISP is bought? Most experts recommend giving the new service a chance. Disruptions that occur while the old network is being absorbed by the new one are often only temporary, and the growing pains may well be worth enduring, especially since the alternative is starting over with a new e-mail address. If you do decide to ride out the transition, be sure to consult the new owner and confirm that you're both on the same page about your billing plan.

On the other hand, if service goes south and shows no signs of improving after 30 to 60 days, don't be afraid to take a hike. You'll find plenty of contenders for your business. But look before you leap. Inverse Network Technology's monthly ISP survey (www.inversenet.com) is a good source of comparative information about connection rates for 25 major services. Similarly, *PC World* provides an annual ISP report that ranks 20 large national and regional ISPs. For the latest report, visit www.pcworld.com/mar99/compare_isps.

If your business depends on a stable e-mail address and URL, consider registering your own domain name. Sure, you'll have to change your e-mail address and Web site URL this time around, and the process might take several days. But you'll be doing it at your own convenience, not under the gun. Your domain can be set up at any ISP (surcharges usually run around $5 or $10 a month). But if your service provider is bought, or if you decide to switch providers, you should be able to set up shop again quickly, with no visible changes to your digital letterhead. Outsiders will have no inkling that you've moved.

Who should take these precautions? Just about anyone who maintains a Web site or e-mail address for business—there's just no foolproof way for you to tell whether or not your ISP is on the block. And midsize to large providers are as likely to acquire other services as they are to be bought.

The only certainty is that consolidation will continue, and that a little bit of preparation now can save you a lot of grief later on. If you're lucky, your service may get better. If not, you can always do what smart consumers have done through the ages: Take your business elsewhere. ▶

How to Survive an ISP Takeover

TAKEOVERS OF ISPs generally occur with little warning: Most people find out that their service is being acquired by reading an e-mail notice or hearing a report on the evening news. Fortunately, most takeovers don't take effect for at least several weeks after they've been announced. If you discover that your ISP is being sold, these tips can help smooth the transition.

DON'T panic. Your service may not change at all, or it might improve if the new owner has a bigger and better network. You may even get cable or DSL service sooner than you would have otherwise.

DO research the new owner. If it's a major company, see how it's been rated by companies like Inverse Network Technology (www.inversenet.com) and surveys such as *PC World*'s annual ISP roundup.

DON'T assume anything. Call the new owner and ask if you'll be able to keep your current e-mail address, billing plan, and connection type (56-kbps, ISDN, DSL, and so on). If you have a Web site, verify that you can keep your current URL.

DO give the new service 30 to 60 days to work out potentially temporary bugs—slow connections, busy signals, inaccessible tech support—as your old network is being absorbed by the new one.

DON'T hesitate to jump ship if you don't like the new ISP's billing plan or if service doesn't improve after two months.

DO plan ahead. If your business depends on a permanent e-mail address and/or URL, register your domain name or set up a Web-based e-mail account with a large, stable service such as Yahoo Mail or HotMail. You can forward mail to your new account immediately and notify correspondents of your new address before the old one disappears. If you register a domain name, specify yourself as the administrative and billing contact. This step ensures that you—and not the provider—will retain all the paperwork if the ISP disappears.

ILLUSTRATION: JAMES YANG

Web Scam! How One ISP Took the Money and Ran

CONSUMER ALERT

ALL GREGG Buchanan wanted was an Internet account for his 80-year-old mother. Instead, he got taken for a ride.

Buchanan, a senior applications engineer for Intel in Hillsboro, Oregon, was no newbie. When he shopped for an Internet service provider in January, he used an ISP finder site on the Web, assembled a spreadsheet of his top choices, and visited their home pages.

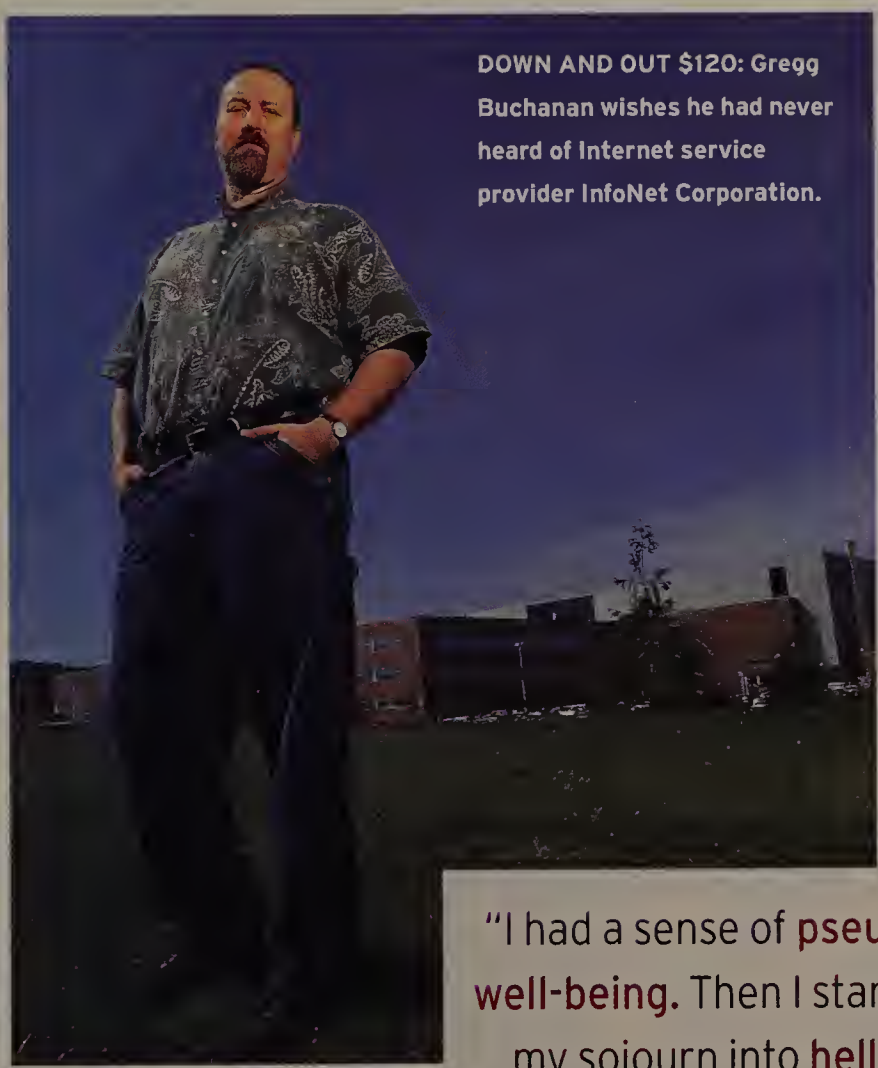
THE PHANTOM ISP

ONE ISP stood out: InfoNet Corporation. "InfoNet had a professional-looking site and an attractive offer," Buchanan says. A year's worth of Web access—including two e-mail accounts and space for a home page—cost a mere $9.99 a month. So he activated the account instantly by paying via I-Check.net, a third-party service that debited $119.88 from his mother Geraldine's checking account.

At first, Buchanan says, "I had a sense of pseudo well-being. Then I started my sojourn into hell." He couldn't get the second e-mail account or the server space they'd paid for. InfoNet didn't return his phone calls or e-mail. After two weeks, the access account stopped working. Buchanan and his mother were out $120, and they were steamed.

They were not alone. A *PC World* investigation has uncovered dozens of angry users who'd like to have a word with Matthew Nichols, InfoNet's alleged CEO. At press time, the U.S. Postal Inspector's office in Charlotte, North Carolina, was investigating the company for potential mail fraud.

The InfoNet story illustrates how the Web—with its low start-up costs and the ability to operate from anywhere—can help a marginal business fool even Web-savvy consumers like Gregg Buchanan. It also shows how easily a virtual company can vanish.



DOWN AND OUT $120: Gregg Buchanan wishes he had never heard of Internet service provider InfoNet Corporation.

"I had a sense of **pseudo well-being.** Then I started my sojourn into **hell.**"

THE WEB SHELL GAME

AT FIRST GLANCE, InfoNet certainly looked the part of a big national service provider. Its Web site advertised an extensive menu of Internet services, as well as access numbers across the country. The company claimed to be the "fifth-largest ISP in the world," serving more than 200,000 customers. It boasted it had offices from the Florida panhandle to Puget Sound, including a headquarters at One InfoNet Way in Atlanta.

In reality, InfoNet operated out of a rented townhouse on a residential street in Franklin, North Carolina. According to the U.S. Postal Service, the One Infonet Way address—along with eight other locations listed in the company's domain name registrations—does not exist. Only four of the company's many phone numbers worked; all sent callers to the same voice mailbox.

And if the site at www.infonetcorp.net seemed impressive, it was for good reason. At one point in February, InfoNet's site contained copies of pages found on www.ibm.net, including a page sporting *PC World's* Best Buy logo. (IBM Internet Connection Services won a *PC World* Best Buy award in 1997; we've never reviewed InfoNet.) In a published report, Matthew Nichols, identifying himself as CEO of InfoNet, blamed an unnamed Web design firm for the error. (Our numerous attempts to contact Nichols for comment were unsuccessful.)

After IBM contacted InfoNet, the look-alike pages were replaced by a notice saying the firm had been "sold to Access-Net Communications of Denver, Colorado, for $2.5 million." A few days later, the site reappeared sporting a new look, then disappeared again.

Angry InfoNet customers began trying to reach the company. About two dozen of them contacted the Infonet Services Corporation, a $380 million communications services firm in El Segundo, California. The firm, which has no affiliation with the similarly named ISP, has filed a trademark infringement suit. However, it has not located Matthew Nichols to serve him with a subpoena, says Michael Grace, an attorney handling the suit.

Another 45 customers contacted I-Check.net, the vendor that provided InfoNet's payment system. Ron Ehli, CEO of I-Check in Tacoma, Washington, says that his company turned off the account in ▶

PHOTOGRAPH: ROBBIE MCCLARAN

Can You Trust ISP Finders?

WHEN YOU'RE SHOPPING for a new Internet service provider, an ISP finder is a logical place to start. Gregg Buchanan went to Internet.com's The List; George D. Malmos and Catherine Evangelista searched ISPs.Com, a database found on CMP's TechWeb site. All relied on the listings found in these popular databases—and all got burned by InfoNet.

It's not always obvious, but ISP finders are not ISP reviews. The listings in these databases are supplied by the ISPs themselves; those who manage ISP finders rarely do more than verify a company's Web site. (PC World Online does not attempt to verify all company information in its ISP Finder at www.pcworld.com/top400/isp.)

HARD TO LOSE

ONCE AN ISP makes the list, it can be hard to kick it off. Matthew Self, president of ISPs.Com, says he's received complaints about both InfoNet and InTech. But when he attempts to remove them from the database, they simply reregister. "I've nuked them off the list probably ten times, and they keep coming back," he says.

Gus Venditto, Internet.com's editor in chief, says he tries to resolve discrepancies between The List database and the services an ISP actually provides. If he can't resolve the problem, he removes the ISP.

In short, think of ISP databases more like Yellow Pages ads—a guide to what's available, but no substitute for checking reviews or calling the ISPs and grilling them about what kind of services they really provide.

late February, due to I-Check's inability to contact InfoNet about the complaints.

VANISHING POINT

WHEN A brick-and-mortar company goes under, it leaves a street address. But a Web-based firm can seem to evaporate completely. If the addresses it provides are phony, you may not know where to turn when you've been burned.

"Generally, you need a physical address to make a complaint," says Susan Grant, director of Internet Fraud Watch in Washington, D.C. "If it's a Web site, you can get information from the site-registration people, but it may just be a front for someone else."

Gregg Buchanan, looking for information about InfoNet, searched Network Solutions' domain registration database (www.networksolutions.com), but most of the InfoNet data he found was false. Network Solutions representative Nancy Huddleston says that with more than 7000 domain registrations a day, the company can't verify the addresses, phone numbers, or identities of registrants.

Disgruntled InfoNet customer George D. Malmos, a pharmacist in Cedar Hill, Texas, tried the Better Business Bureau in Georgia and Colorado, but he also had no luck. "To get ripped like this and get nothing but vapor trails is incredibly irritating," says Malmos.

One persistent InfoNet customer, Catherine Evangelista of Cary, North Carolina, managed to track down the company and get a refund.She talked to the local sheriff, the state attorney general's office, the regional postal inspector, and the FBI. She even sweet-talked a phone company representative into dialing Matt Nichols' unpublished telephone number.

Eventually, Evangelista got her money back, plus a little extra for the long-distance charges she incurred. "I don't know if what happened to me was fraud, but it was pretty damned hard to get my money back," she says.

Eddy Boucher, a postal inspector in Charlotte, says that his office is reviewing mail fraud allegations based on InfoNet's receipt of payments through the U.S. mail.

ALIVE AND CLICKING

THE STORY doesn't end there. *PC World* has found two other ISP companies—one defunct, the other still active—with links to InfoNet.

In early 1998, Franklin, North Carolina–based Western North Carolina Internet (www.wncnet.net) began offering dirt-cheap Net access. Then consumer complaints started pouring in, says Pat Taylor, chief investigator with the Macon County sheriff's office. Users who had paid for Internet access could no longer log on. Six months later WNC Net shut down in the midst of an FBI investigation.

In an e-mail sent to WNC Net subscribers in October 1998, co-owner Donnie Griffin admitted to reselling a handful of Internet accounts to several users. Last March, the U.S. Attorney's Office declined to press charges against Griffin, who was 16 at the time of the investigation. In a report published last March in the *Franklin Press*, FBI spokesperson Joanne Morley says ▶

Caveat Webtor

Seven ways to avoid getting taken by a bogus ISP.

Be skeptical. Just because it's on a Web site, in an ISP finder, or in the domain name registration database doesn't mean it's true.

Get in touch. Call the phone numbers, send e-mail, drop a postcard. Get a satisfactory response before doing business.

Think short-term. Don't buy a year's worth of service from a company you've never heard of.

Use plastic. Many legit companies take checks or cash, but the best way to limit your losses is to pay with a credit card.

Be persistent. If you complain enough, they may give you a refund just to shut you up.

Call the cops. When all else fails, contact your state consumer affairs office or regional postal inspector; fill out a complaint form online at www.ftc.gov.

Get smart. Raise your consumer IQ at the National Fraud Information Center (www.fraud.org) or the Federal Trade Commission's excellent site (www.consumer.gov).

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that the Attorney's Office "declined to prosecute, probably because [Griffin is] a juvenile."

An ad that WNC Net placed in the *Franklin Press* last September identifies Judy Estelle as co-owner of the ISP. Estelle's last known address is the Franklin townhouse that was home to InfoNet. Investigators for the sheriff's office in Rabun County, Georgia, say that Judy Estelle also received mail at InfoNet's P.O. box in Dillard, Georgia.

On February 18 of this year Estelle opened a new account with I-Check.net for InTech @net (www.intechinet.net), a low-cost service provider based in Frisco, Colorado. (According to Ehli, I-Check closed the account once it learned InTech was related to InfoNet.) Two InfoNet phone numbers were also used by InTech; both send callers to the same voice mailbox. *PC World* sent overnight letters to ten locations provided by InTech@ net; all were returned due to invalid addresses or recipients.

Figure out who you're doing business with before you start doing business with them.

At the time we went to press in April, *PC World* had not received any complaints from InTech@net customers. A dial-up account we opened with the firm was still operating after a month.

We tried to contact InTech via mail, phone, fax, and e-mail. In return, we got an e-mail signed by "Lori Hendricks, president" of InTech. The e-mail denied that InfoNet had any ownership interest in InTech and said that InfoNet merely provided its "ISP backbone" and handled all of its "technical matters," including domain name registrations.

Soon after we received that e-mail, the www.infonetcorp.net site reappeared, featuring a letter from "William R. Page Jr., Founder/Chairman/CEO." (On InTech's domain name registrations, William Page Jr. is listed as vice president of InTech Corporation.) The letter offered to restore access to users who had been cut off, but it said that the company would not provide refunds. One InfoNet user contacted by *PC World* reported that his service had been restored.

That's not good enough for Gregg Buchanan. "You put up a Web site, and people just pour money into it. It's amazing how well they can hide."

The moral? Know who you are doing business with *before* you do business with them. As we move closer toward a Web-based economy, that advice is more relevant than ever.

—*Daniel Tynan*

Windows, Windows, Windows! Three New Versions Coming in Next 12 Months

ANALYSIS

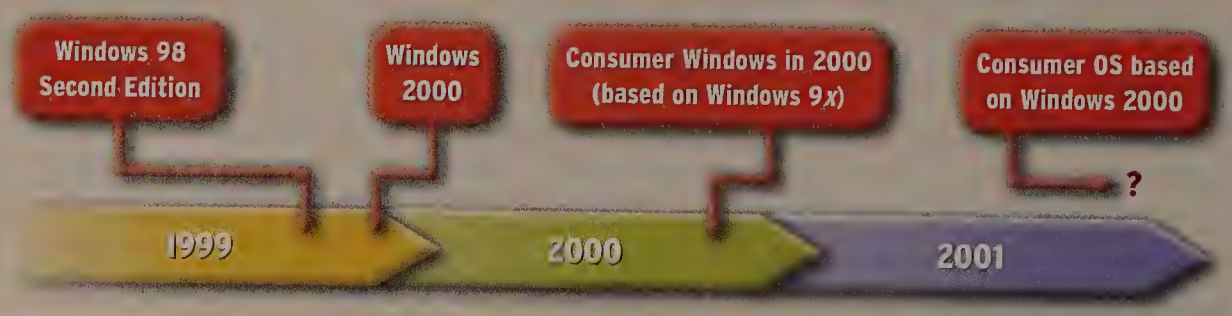
LAST YEAR, Bill Gates promised us that Windows 98 was the end of the line for DOS-based Windows—that Microsoft would base all its future operating systems on Windows 2000 (the OS formerly known as Windows NT). But it turns out Bill was wrong.

This fall, Microsoft will release Windows 98 Second Edition, an upgraded version of Windows 98. The company has also decided to release another Windows 9*x*–based operating system, probably in the latter half of 2000. Meanwhile, Windows 2000 should appear by the end of this year. The company still intends to create a consumer OS based on Windows 2000, but that product probably won't appear until 2001 or later.

So what should you do? Stick with Windows 9*x*? Upgrade to Windows 2000 when it comes out? Our first looks at the latest betas of Windows 98 SE and Windows 2000 indicate that if reliability and security are at the top of your OS wish list, Windows 2000 will be worth waiting for. But if compatibility with older applications and entertainment-oriented hardware is more important to you, the Windows 9*x* line will still be your operating system of choice.

Where Is Windows Going?

For the next year, Microsoft will continue with two separate operating-system lines—one based on the DOS/Windows 9*x* kernel, the other on Windows 2000. But sometime in the next two to four years, the company hopes to unify the two lines.



WINDOWS 98, TAKE TWO

AS THE NAME implies, Windows 98 Second Edition is the same old OS gussied up with a few new tweaks. While SE may be a good upgrade for people still using Windows 95 or Windows 3.*x*, Microsoft admits it's not a must-have for Win 98 users, and that it will be attractive mainly to early ▶

ILLUSTRATION: JAMES YANG

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adopters of home networking, cable modems, and DSL.

The upgraded OS will include Internet Explorer 5, support for new types of hardware (such as the new Device Bay, IEEE 1394, and the aforementioned DSL and cable modems), and some bug fixes. But its most significant new feature is Internet Connection Sharing, which lets networked users access the Net simultaneously over a single connection and ISP account.

In testing a prerelease version of SE, we found ICS dead simple to set up: After a quick install, all the systems on a basic home network were able to share a single Dial-Up Networking connection. ICS is not unique: Such "proxy" products have been available for years. But ICS makes this functionality easier for users to implement—and signals Microsoft's intention to make home networking an integral part of its operating systems.

Windows 98 SE will appear this fall in three forms: an OEM version for installation on new PCs; a retail version (about $89) aimed at upgraders from Win 3.*x* and Win 95; and a $20 CD-ROM that current Win 98 users can order from Microsoft. A free service pack containing just the bug fixes will be available for free download. Other features of Win 98 SE—including Internet Explorer 5, DirectX 6.1, and some noncrucial security and Y2K fixes—are already available for free online.

THE FUTURE OF 9x

BUT THAT'S NOT the end of Windows 9x. At the recent Windows Hardware Engineering Conference in Los Angeles, Microsoft President Steve Ballmer announced that the company will release a new consumer OS, based on the same kernel as Windows 98, in time for holiday shopping in December 2000.

Ballmer says the new operating system—unofficially known as Consumer Windows in 2000—will emphasize easier setup, faster booting, and self-healing (in which the operating system detects and solves problems without interrupting the user). The new OS is also likely to continue Microsoft's commitment to home networking by supporting Universal Plug and Play, the Microsoft-initiated technology for enabling smart devices—including consumer electronics—to interconnect with your computer and with one another.

Meanwhile, Microsoft is planning to ship Windows 2000—which was originally scheduled to ship in 1998—by the end of 1999. The current target date for shipping the operating system to computer vendors is October 6.

Observers question the **wisdom of shipping** Windows 2000 at a time when IT managers will be **grappling with year 2000** problems.

Observers question the wisdom of shipping a major new corporate operating system at a time when IT managers will be busy grappling with the year 2000 problem. But Microsoft product manager Kim Akers insists that Y2K will not delay Win2K.

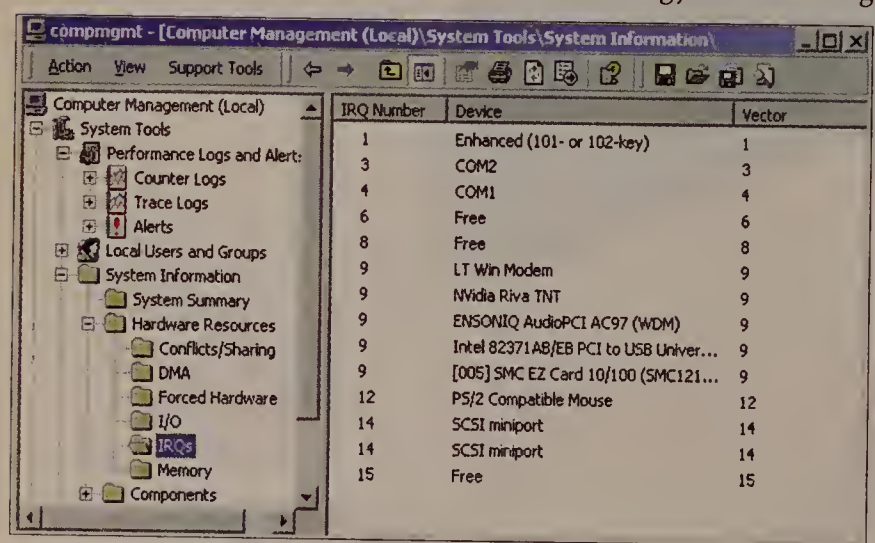
In looking at a prerelease version of Windows 2000 Professional (the desktop version of the new operating system), we found reliability high on the list of new features. For example, when we tried to install Lotus SmartSuite on our test PC, the System Protected Files feature detected that the Lotus installer was trying to overwrite certain crucial system files. If an application attempts to install a DLL over the version that came with Windows 2000, System Protected Files automatically replaces the interloper with the original file on the next boot-up.

GRAND UNIFICATION

THOUGH Microsoft continues to develop both Windows 9*x* and Windows 2000, the company hasn't abandoned its dream of unifying its operating systems into a single product, with separate flavors for the home and corporate markets. This consolidated system, however, won't be available until 2001 at the soonest.

Why the delay? The biggest problem, according to Microsoft, is the two markets' different requirements. The corporate buyers prize reliability and security above all, while the home market wants backward-compatibility with older applications and optimized support for gaming hardware. The current incompatibility of design goals ensures the continued separation of the two product lines.

For now, Microsoft's marketing message remains the same: Businesses of all sizes should move to Windows 2000 as soon as possible. Meanwhile, home buyers—and anyone still using Windows 95 or 3.*x*—should consider upgrading to Windows 98 SE; those who don't find Windows 98 SE compelling enough can wait for the next version of Windows 9*x* in the year 2000 or for the consumer version of Windows 2000 sometime after that. Our advice: Upgrade your OS if and when you need to, but don't plan too far ahead. ▶



WINDOWS 2000's Computer Management console combines on one screen a number of utilities that had been scattered across separate applets.

ILLUSTRATION: JAMES YANG

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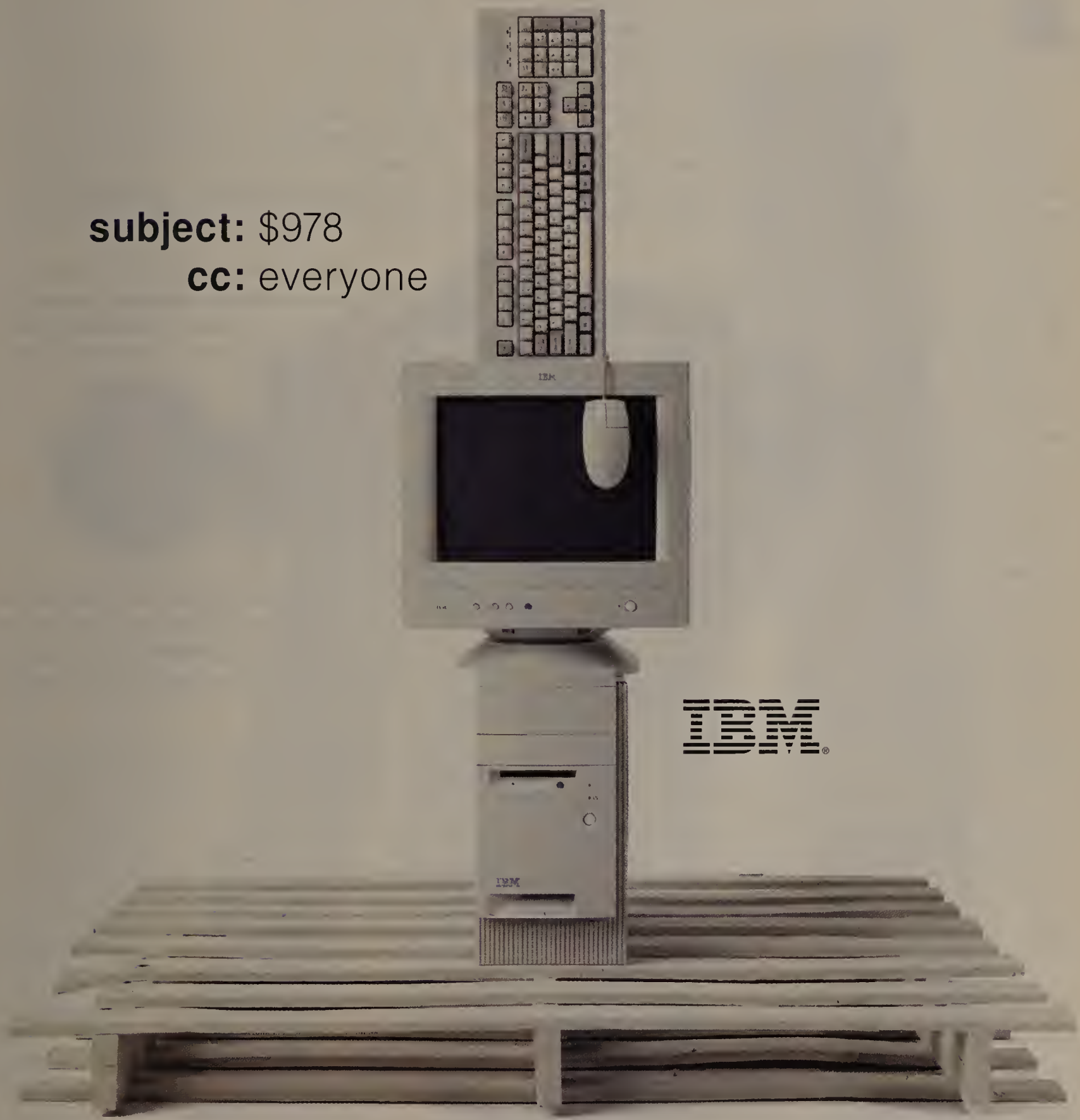

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New Celeron-466 Offers Lots of PC for Little Money

LONG LIVE competition. Now that AMD is winning some serious market share, Intel speeds up its Celeron chips almost as often as Al Gore takes credit for being a founding father of the Internet. As a result, sub-$1500 computers have never looked better. Consider, for example, Micron's Millennia C466 desktop, powered by the new 466-MHz Celeron processor. The Millennia C466 runs productivity applications at much the same level as a Pentium III-450 machine, but it costs only $1448, including a 17-inch monitor.

You'll need to shop carefully, however. Some Celeron-466 systems will soon ship with an optional chip set, called the 810, in place of a graphics card. We haven't tested the 810 yet, but we do know it won't offer high-end graphics performance.

LOOKS LIKE PIII

TODAY'S CELERON systems run business apps exceedingly fast. Intel is so intent on producing budget chips that will enable PCs to outperform AMD-based systems that it is blurring the line between PIII and Celeron performance.

Micron's Millennia C466, which we tested with 64MB of RAM and Windows 98, earned a PC WorldBench 98 score of 213. The average Pentium III-450 machine performs almost identically on business apps, at 217. An AMD K6-III-450 PC earned a similar score of 212; costlier K6-III-450 machines with more L3 cache have scored 226 and 231. But the Micron Millennia C466 costs $100 to $300 less than Pentium III and K6-III systems with similar configurations. (Our system came with a 13GB hard drive, a 40X-max CD-ROM drive, a 56-kbps modem, and an integrated 8MB NVidia RIVA 128 graphics chip.

So why should you pay more for a PIII? For many people, the answer is "you shouldn't." It's worth noting, however, that PIII machines' 100-MHz system bus speeds work with large files; in contrast, Celeron systems use a 66-MHz system bus. Pentium III processors also include the new streaming SIMD instructions, which accelerate optimized graphics applications, games, and browser plug-ins. That's not much of an advantage, though, until more of the optimized software arrives.

UPGRADE POTENTIAL

IF YOU EXPECT to ever upgrade your PC's CPU, the motherboard is an issue. Today's PII and PIII chips—and some Celerons—plug into Slot 1 on the motherboard, but all Celerons starting with the 466 will have pins and fit into Socket 370. If your Celeron fits into a socket, you'll have to buy a new motherboard to upgrade to a PII or PIII.

In the Millennia C466, Micron worked around this limitation by using a socketed Celeron-466 chip on a daughtercard that plugs into a Slot 1 motherboard (see the photo above). To add a PIII later, you simply remove the daughtercard, upgrade the BIOS, and plug in a PIII cartridge.

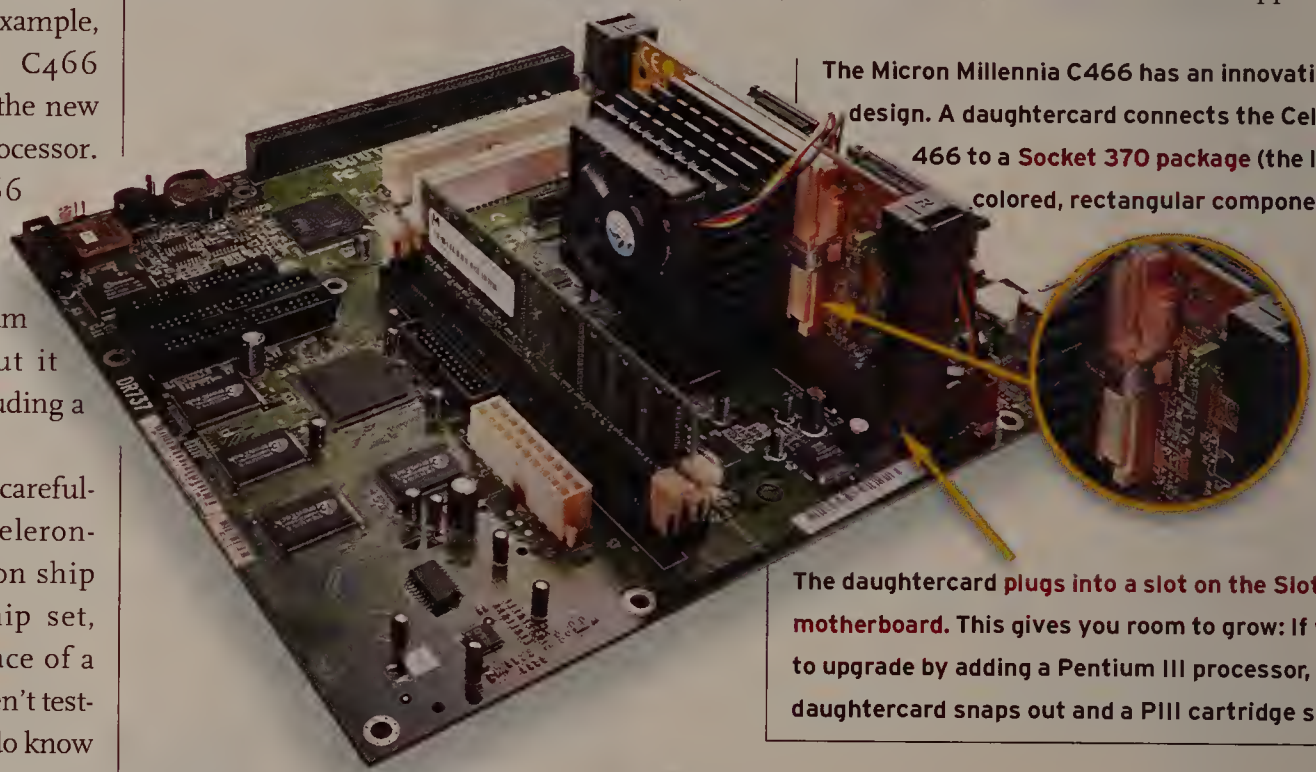
THE 810 CHIP SET

AS YOU SHOP, remember that Celeron-equipped PCs may use any of several chip sets. The Micron Millennia C466 uses the BX chip set. Intel's optional 810 chip set, which integrates a new Intel 3D graphics processor, will appear in some systems in early June.

Intel says the 810's integrated graphics will perform on a level with low-end 2X AGP graphics cards on applications such as 3D games. Of course, we want to test shipping systems to judge whether that turns out to be the case. Unfortunately, if your system uses the 810 chip set, you won't be able to add an upgrade graphics card.

But don't let a few gotchas scare you away—$1448 has never bought so much PC

—*Laurianne McLaughlin*



The Micron Millennia C466 has an innovative design. A daughtercard connects the Celeron-466 to a Socket 370 package (the light-colored, rectangular component).

The daughtercard plugs into a slot on the Slot 1 type motherboard. This gives you room to grow: If you want to upgrade by adding a Pentium III processor, the daughtercard snaps out and a PIII cartridge snaps in.

PHOTOGRAPH: MARC SIMON

Wonder what's happened to Cyrix, Intel's other rival? Visit www.pcworld.com/jun99/cyrix. ▶

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Geeky Old Linux Gets a Windows Makeover

ANALYSIS

DESPITE Linux's underdog appeal and expanding share of the server market, using the Unix clone as a desktop operating system has until now been strictly for geeks. Linux has never been able to match Windows 98's nearly hands-free installation, encyclopedic Plug and Play hardware support, and cadre of available applications.

UPSTART ON A ROLL

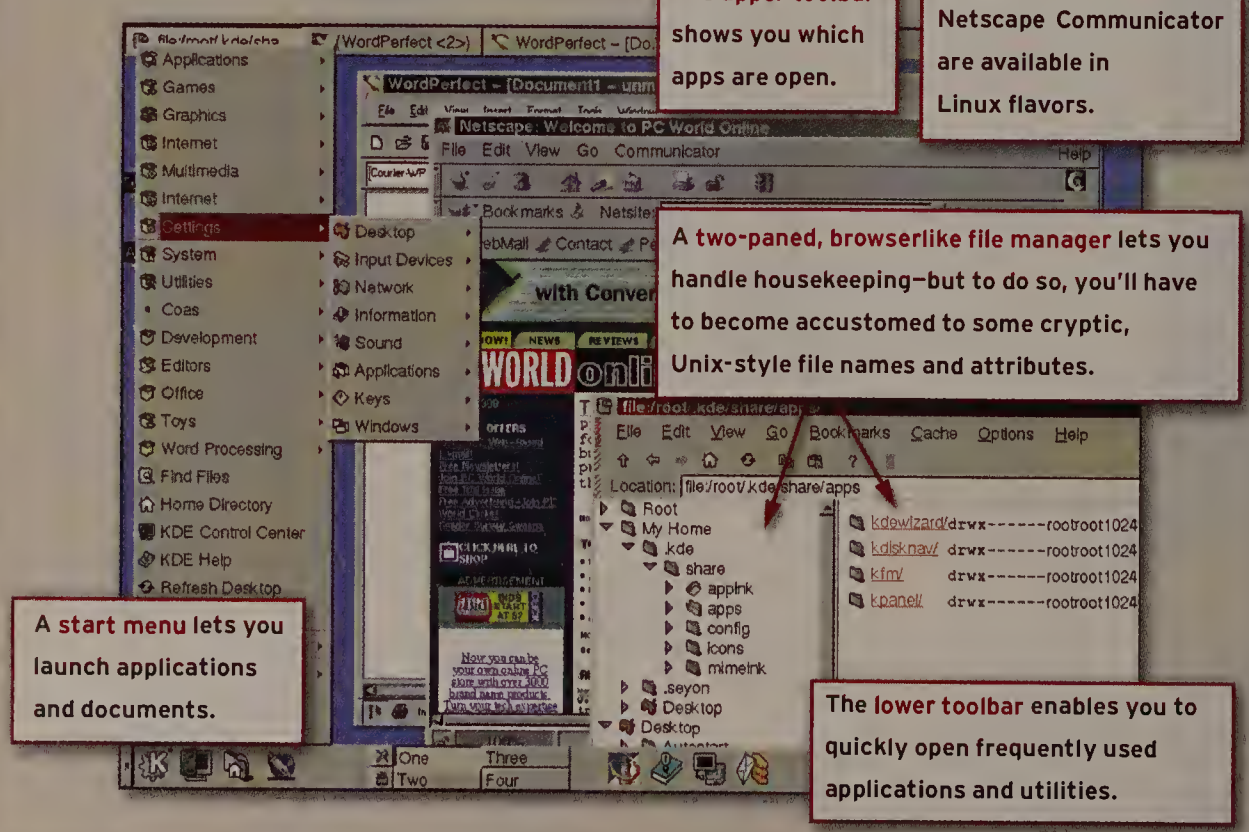
BUT TWO NEW versions from Caldera and Red Hat make the upstart OS a reasonable alternative for the rest of us. Both offer improved installation programs, broader hardware support, and new graphical interfaces that bear a striking resemblance to Windows. And compared to Windows, Linux costs almost nothing. The Caldera and Red Hat bundles list for between $40 and $50 each, but they include the OS and hundreds of applications; the base OS itself is available as a free download from hundreds of Web sites.

The advent of these kinder, gentler Linuxes is just one more indication that the alternative OS is on a roll. This year IBM, Compaq, and Dell have all announced that they'll install and support Red Hat Linux on desktop computers. Market research firm International Data Corporation says commercial Linux shipments will grow at a rate of 25 percent per year through 2003, compared to 10 percent per year for all other desktop operating systems combined.

Nevertheless, Linux has a ways to go before it becomes a major OS contender. Latest estimates put its installed base at around 7 to 10 million, compared to the hundreds of millions running some version of Windows. And Linux has no unified, concerted marketing campaign to drum up mainstream popularity (of course, neither did a little thing called the Internet). More pertinently for end users, the shortage of Linux-based application software, the attendant file compatibility problems between Linux and Windows users, and a lack of hardware support—particularly for USB and DVD—mean that Linux remains a hard sell. ▶

Look Familiar? Look Again

The KDE graphical user interface for Linux could, at first glance, be mistaken for Windows 9*x*.



More help for year 2000 woes is on the way. Microsoft offers a Windows 95 fix, and Symantec and Network Associates are improving their Y2K analysis programs. For downloads, check www.fileworld.com/magazine.

Software Solutions

■ **WINDOWS 95 FIX:** Microsoft has released a free fix for 13 minor Y2K problems in Windows 95. Targeted problems include the old Windows 3.1 File Manager's inability to display or sort on 21st-century dates, the DOS DATE command's rejection of two-digit years below 80, and MSWallet's failure to accept credit card expiration dates formatted as MM/YY with years beyond 2000. The fix is available via Microsoft's Web site at www.microsoft.com/year2000.

■ **NORTON 2000 2.0:** This major upgrade from Symantec (www.symantec.com) is due in late May or early June but wasn't ready for preview in time for this article. Among the promised new features are customizable reports that let you sort and filter problems in various ways so you can create, for example, a list of Excel files with dates near the pivot year. Ease-of-use tools include a wizard to walk you through fixing problems in Excel and Access files. Pricing for this corporate product starts at $580 for a ten-user license.

■ **2000 TOOLBOX 1.05:** At press time, Network Associates (www.nai.com) was about to offer 2000 Toolbox 1.05 as a free

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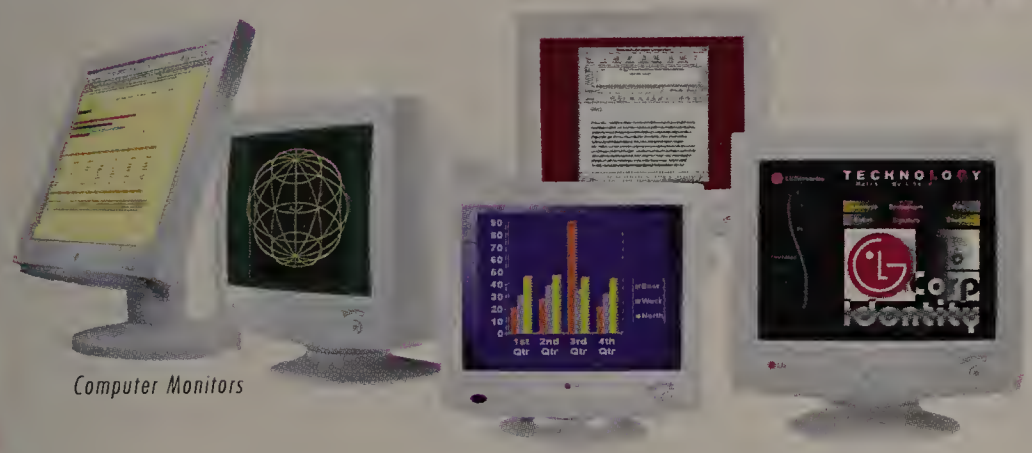

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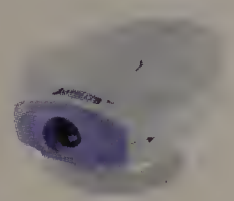

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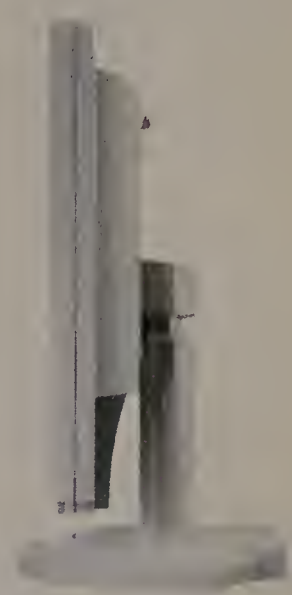

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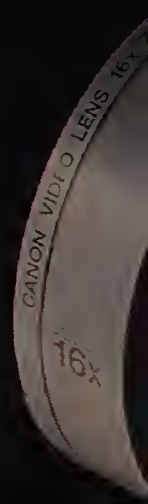

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UP AND RUNNING IN MINUTES

I TESTED beta versions of Caldera's OpenLinux 2.2 and Red Hat Linux 6.0 on a Micron Pentium III-500 system. Though I'd installed various flavors of Linux in the past, I'd always given up before getting many key components properly configured.

So I was pleasantly surprised by how easy it was to get Caldera's version installed and working. The OpenLinux bundle includes a special edition of PowerQuest's PartitionMagic, which made creating the necessary Linux disk partitions much easier. After finishing the partitioning in Windows 98, my system rebooted and zipped through the business of installing files and identifying hardware. I met with only one obstacle: The program that configures the graphical interface didn't get my video board settings quite right, preventing the KDE graphical user interface from loading. Experimenting with more conservative settings solved the problem.

The beta version of Red Hat Linux 6.0 was considerably rougher. As we went to press, it was still a couple of weeks away from its planned early May ship date, and my installation experience was bumpier than with OpenLinux. Like OpenLinux, Red Hat Linux 6.0 partitioned my drive and installed files with little intervention from me. But installing hardware was harder. I had to scroll through a list of hundreds of boards to find my Diamond Viper 550 graphics card. And Red Hat's installer couldn't find a driver for my network adapter, so I couldn't use a network connection to the Internet. A configuration utility allowed me to create a dial-up Internet connection, but getting the details right may be trickier than the average Windows Dial-Up Networking user expects.

> The interfaces are **similar enough** that you could switch **between Linux and Windows** without developing a personality disorder.

In both cases, once I had the OS installed, I was ready to explore the graphical user interface and start browsing the Web. Windows veterans should quickly get the hang of OpenLinux's KDE and Red Hat's GNOME. Both let you store files on the desktop, launch applications and utilities from a pop-up menu, and track running applications with taskbar icons. Most menus and icons display balloon help when you hover the pointer over them. Though they differ in details, and each has its own idiosyncrasies, the interfaces are sufficiently similar—to Windows and to each other—that you could switch between either and Windows without developing a personality disorder.

APPLICATIONS AWOL

MICROSOFT IS unlikely to release a Linux version of its Office suite any time soon, and many bread-and-butter Windows apps may never appear in Linux form. Still, both Linux bundles I looked at ship with literally hundreds of applications and utilities.

Many of these only a Unix geek could love. But bundled programs include Netscape Communicator; a Photoshop-strength image editing application known simply as The Gimp; utilities; and numerous games. Caldera's Linux bundle also comes with copies of Corel WordPerfect 8 for Linux, which reads and writes Word files, and Stardivision's StarOffice 5.1, which includes a word processor, database, and spreadsheet that can read and write most Office file formats (albeit imperfectly).

But ultimately, if you need 100 percent compatibility with Microsoft Office, or you rely on Office's more advanced features, you'll still need Windows. And until Linux's authors get around to writing the necessary drivers, you can forget about playing DVDs, connecting to USB devices, and using other newfangled technologies like IEEE 1394 FireWire. But that doesn't mean you can't keep a copy of Linux on the side. After all, if the revolution's coming, it can't hurt to be prepared.

—*Scott Spanbauer* ■

OpenLinux 2.2
$50 list; **Caldera Systems;**
www.calderasystems.com
PRODUCT INFO NO. 732

Red Hat Linux 6.0
$40 list; **Red Hat Software;**
www.redhat.com
PRODUCT INFO NO. 733

Y2K REPORT

update. This upgrade is more extensive than its version number suggests. Improvements include information on more apps, NT support, an automatic fix for Windows' short-date format, and a central program that ties the pieces together. You may already have this version without knowing it. To find out, select *Start•Programs•2000 Toolbox*. If you see an option called Central, you've got 1.05. If not, select Instant Update.

■ **TRIMARAN 2000:** A new $300 program from Systemic Solutions (www.systemicsolutions.com) helps you manage your company's—as opposed to your computer's—Y2K issues. The package includes a wizard for helping you assess your company's weak points and an inventory program for tracking computer assets that may still have problems. Trimaran 2000 also comes with Greenwich Mean Times' Check 2000 PC Deluxe, one of best programs for managing your PC's Y2K problems.

TIRED OF Y2K?

■ **END IN SIGHT:** *PC World* asked several Y2K heavyweights when the problem will pass. They unanimously agreed that most—but not all—of the headaches will be behind us by the first days of 2001. *Countdown Y2K* coauthor Peter de Jager predicted that problems will trickle through to 2003, "the year tax returns will cover the 2001-to-2002 time period." Gartner Group analyst Lou Marcoccio says "lawsuits could last for three to ten years." But Greenwich Mean Time's Karl Feilder proved most pessimistic, predicting that "around 10 percent of businesses will fail as a result [of Y2K]; thus the impact to them will be permanent."

—Lincoln Spector

ILLUSTRATION: JAMES YANG

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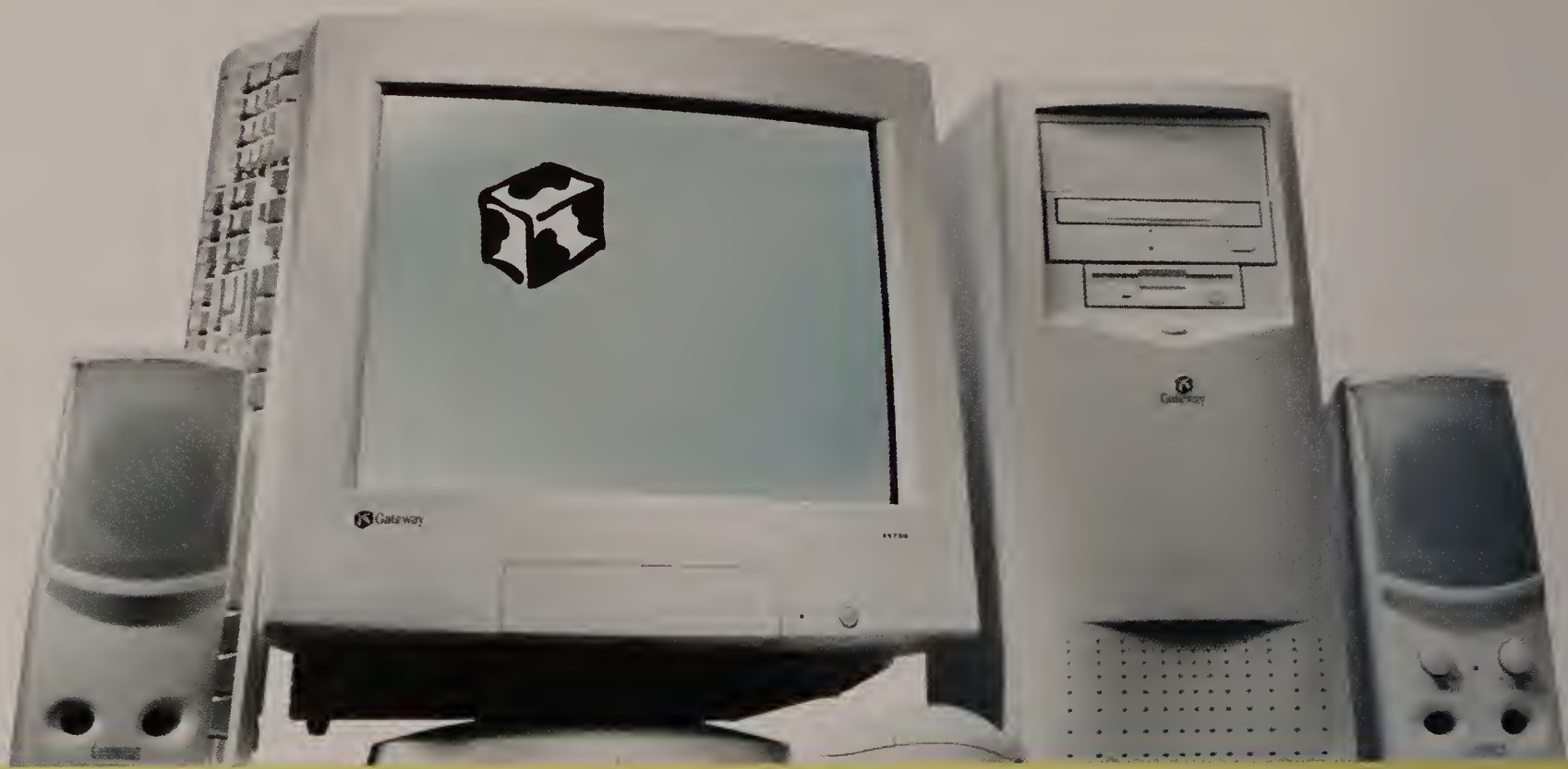

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- GCS-200 Speakers by Cambridge® SoundWorks
- 56K[1] Internet/Fax Modem
- Microsoft® Windows® 98
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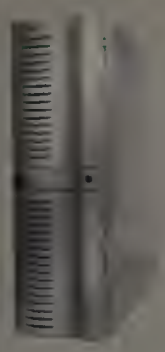

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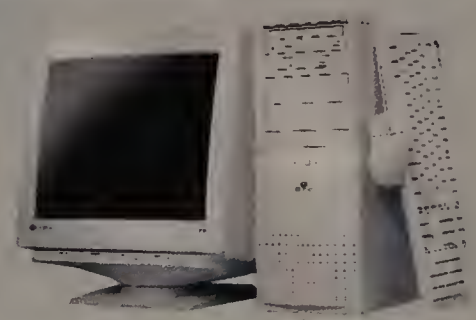

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NOT TOO LONG AGO, being on the road meant being out of touch. Mobile managers who left the office also often left behind a significant chunk of their business functionality, spending hours if not days separated from important data that sat waiting in unanswered E-mails and unheard voice messages.

THE MOBILE MANAGER SERIES • PART 3

Aventail Corp.'s Evan Kaplan stays effortlessly connected when traveling by using the latest web-based mobile technology.

JOHN HOLLINGSWORTH

But thanks to the Internet, mobile managers are now able to sustain a much higher level of connectivity to important information. With Web-based applications that eliminate many of the remote-access hassles, along with newer, slimmer devices tailored especially for a life on the go, today's mobile manager can hit the road confident of being able to stay in touch like never before.

Harnessing the power of the World Wide Web starts even before mobile managers leave the office. Evan Kaplan, president and CEO of Seattle-based Aventail Corp. a 2 -year-old company that focuses on extranet management and security, begins his travel preparations by logging onto the Expedia travel Website. There, Kaplan can create an entire trip itinerary,

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You can take all of your vital information with you, everywhere you go, and back again. Just connect your desktop PC with your Handheld PC, and **any changes are automatically updated between the two machines.**

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booking multiple plane reservations as well as securing rental cars and hotel rooms all from a single site. When Kaplan has finished his planning, he E-mails his details to an administrative assistant or directly to a travel agent, where the trip booking is completed.

TODAY'S MOBILE MANAGER CAN HIT THE ROAD CONFIDENT OF BEING ABLE TO STAY IN TOUCH LIKE NEVER BEFORE.

"Being able to make all my reservations in one place saves me a lot of time and hassle," says Kaplan, who spends an estimated 35% of his time on the road, visiting customers and business partners. Web sites like Expedia are doing all they can to lure frequent customers like Kaplan, adding features such as single-click searches for the lowest airfares and other cost-saving deals. Indeed, some travel Websites, especially those run by airlines and rental car agencies, are now offering E-mail notification of special savings and rates.

"Saving money on travel is important to us, because we're still a small company, and we have to watch what we spend," Kaplan says.

Until recently, a mobile manager could almost always count on being burdened by a weighty companion: the laptop computer. Thankfully, computer vendors have taken mobile managers' well-being into consideration and are producing ever-lighter versions of powerful machines. A wide range of manufacturers now offer thin, light machines equipped with the fastest, latest-model microprocessors and sharp color screens that keep a professional edge on presentations.

Your presentation wouldn't be complete without a lightweight projector, however. At just under 10 pounds, Sharp Electronics Corp.'s Notevision5 is packed with all the features any serious presenter on the road will ever need. Sharp's autoSYNC and ImageACE features make sure your picture is perfect each and every time. And new Ir-COM capability lets you beam your presentation from any IrDA equipped laptop directly to the projector so you can leave the cables at home. It also features 600 ANSI lumens for bright, clear images.

JUST THE BASICS

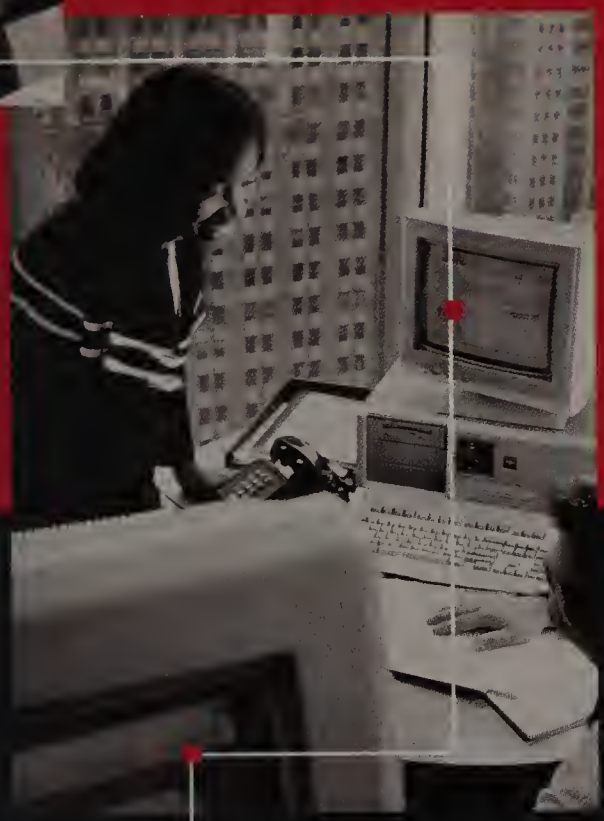
And for the mobile user who only needs the basic functions, such as simple access to E-mail and scheduling or spreadsheet applications, there is the handheld computer. Much smaller and lighter than full-powered PCs, the handheld machines also cost less (under $1,000 for most models) and can be used for up to 12 hours on a single battery. Most of today's handheld models use Microsoft Corp.'s Windows CE as a base operating system *(www.microsoft.com/windowsce/hpc)*. The Windows CE Operating System looks and feels just like Windows 95/NT, so users can easily move from work to the road. You'll be able to keep track of your appointments, log into a database, or access your E-mail. CE easily communicates with Microsoft

continued on page 10

Laptop Lane

TAKE A WALK

Every mobile manager knows the frustration of being stranded, unconnected, and unproductive, in an airport. Now, there's hope for business travelers: One enterprising company is aiming to turn executive downtime in airports into productive work time. Laptop Lane offers private space with Pentium workstations, laptop connections for a direct lin k to the Internet, and access to printers, fax machines, color copiers, and conference rooms, all for rent by the minute or the hour. The service is up and running in three airports (Chicago, Seattle, Cincinnati) with plans for a dozen more to open before the end of the year.



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seeing IS BELIEVING

First-rate presentations deserve top-notch delivery. Maximize their impact by using Digital Light Processing Technology

IT'S ALWAYS DARKEST before the dawn, and that includes the dawning of a new era in presentation technologies. Improved, high intensity image projection techniques, such as Texas Instrument's pioneering Digital Light Processing (DLP) technology, appear ready to relegate liquid crystal display (LCD) projectors to the same fate that befell 8-track tapes — eventual obsolescence.

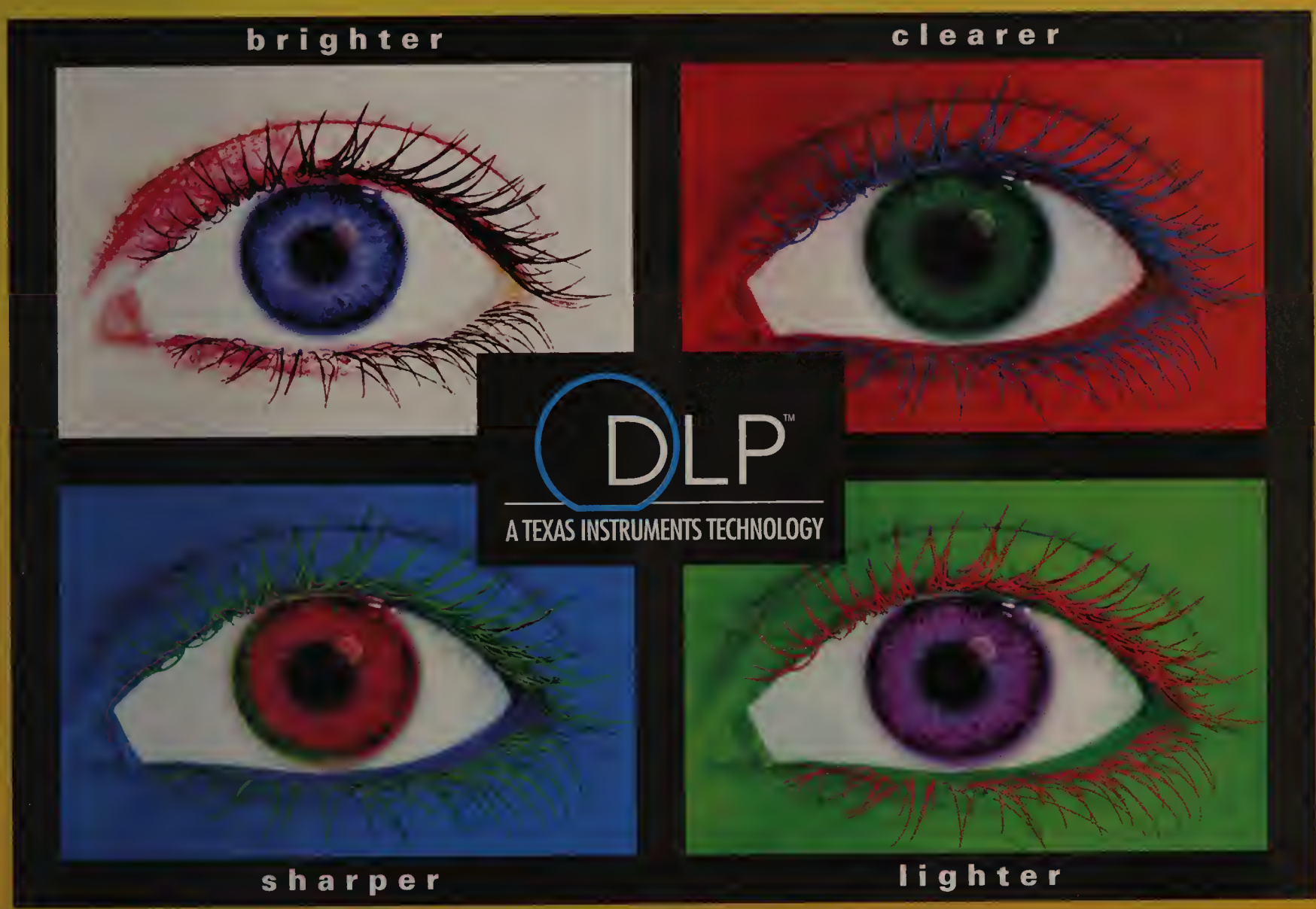
"DLP offers significant improvements over current LCD technologies," says Lars Yoder, a product manager of conference room products at Texas Instruments, Inc. in Plano, TX. "It delivers an ultrabright, high quality image, in both stationary and portable projectors. That helps make you and your presentations more effective in selling your products, services and in communicating ideas." The heightened clarity of DLP-generated images make them easier to view from the side of the room, with less distortion, even in ambient light. It's no wonder then, that DLP has gained the high ground as the technology of choice among projector vendors.

LIGHTING THE WAY

As an approximate guideline, you want a projector to have an ANSI rating between 900 to 1,000 lumens if you plan to use it in a larger room with bright lights. For smaller rooms and audiences up to 20 people, a projector with 600 to 700 lumen rating is recommended. You can get by with even less if you can dim the lights slightly. But, advise the experts, pay attention to the bulb type. For example, ultra high press bulbs used in some DLP projectors will maintain their original output level for the life of the bulb— about 2,000 hours.

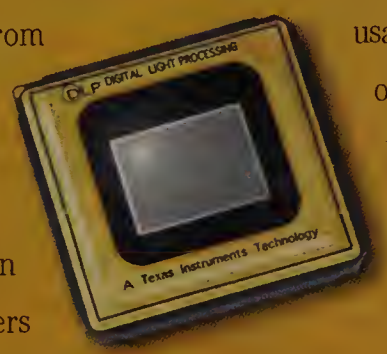
The bottom line for you as the purchaser, is that the advanced technology used in today's crop of personal portable projectors will enable you to present your products, or convey your ideas, in their best light. You just cannot do that as well with yesterday's ho-hum technology, which included fuzzy overheads and clum-

SEE THE DIGITAL DIFFERENCE.



100% digital display technology delivers lighter, brighter ultraportable projectors.

For dramatic, high-quality images look for a projector featuring Digital Light Processing™ (DLP™) technology from Texas Instruments. DLP technology is the revolutionary all-digital projection system that has enabled a new generation of market-leading ultraportables. Unlike LCD systems that contain heavy, complicated optics, DLP technology delivers incredible images through a more compact optical system for smaller, lighter projectors.



With its 100% digital design, DLP technology produces more usable light, achieving higher levels of brightness than other projection systems. And DLP technology's unique digital light displays 16.7 million digitally correct colors for brilliant, breathtaking images that will never degrade over time.

See why over 165,000 projector owners depend on the digital difference DLP technology brings. Call toll-free for a list of leading manufacturers, or visit us on the Web.

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CREATING DRAMATIC VISUAL EXPERIENCES THROUGH DIGITAL SOLUTIONS.

TEXAS INSTRUMENTS

Leveraging DLP's new features will take some out-of-the-box thinking, but the benefits will exceed the effort.

sy slide projectors. Besides, after sweating and fretting over the details of your presentation, you want presentation hardware that will grab and hold the audience's attention. Why relegate your message to anything less than the best delivery technologies available?

One guaranteed attention grabber used by experienced presentation designers, is to open your presentation with an action-packed clip from a DVD movie (try doing that with a slide show or overhead!) Learning to leverage DLP's new features will take some out-of-the-box thinking, but the benefits will exceed the effort. For example, should you need to show a close-up of a chart, a piece of hardware, or how to spear the onion in a martini, you could feed in a signal from a camcorder to provide a room-sized close-up.

"DLP's fast response time makes it ideal for displaying video clips," says Lawren Markle, ViewSonic's projector product manager in Walnut, Calif. "With traditional LCD panel technology, you have to turn pixels on and off to create your image. That process imposes a lag time. While not huge, it can slow down a fast video sequence." ViewSonic's just-launched PJL830 and PJL1030 DLP-based, sub-10 pound projectors employ Zeiss optics to generate sharply focused, high-contrast images. Zeiss's legendary optics, combined with proprietary circuitry to convert the analog image signal into a digital signal, results in purer whites and consistent illumination, Markle says.

Viewsonic PJL830

THAT'S ENTERTAINMENT

Don't bore your audience with slides and overheads. Grab their attention at the get-go with an entertaining video clip using ViewSonic's just launched PJL830 and PJL1030 DLP-based, sub-10 pound projectors. The projectors employ Zeiss optics to generate sharply focused, high-contrast images. This, combined with proprietary circuitry to convert the analog image signal into a digital signal, results in purer whites and consistent illumination.

GETTING YOUR MESSAGE ACROSS

As in every other aspect of their professional lives, your audience likely suffers from information overload. To successfully penetrate the safety zone they've erected, your presentations have to rise above the background noise that tends to distract most people.

"It's all about dynamics," says ViewSonic's Markle. "Because DLP projectors allow you to update your presentation in real time, you can demonstrate changes dynamically. You can't do that with a slide show or an overhead."

While Markle agrees that the future of projector technology belongs to DLP, he maintains that LCD still has a role to play. "Right now some of the industry's brightest products are LCD based. Plus, LCD does a better job of color representation," he says.

HIGH EXPECTATIONS

Many presenters see themselves as educators because, like educators, they convey information. However, unlike lecturing in a classic academic environment, most presenters seek to communicate the benefits of their product or service in a corporate environment where expectations are high and patience is low.

So whether your audience is there to learn about your product, hear about the effect of new tax laws, or how to pack your sky diving parachute, you need to hold their attention. The right hardware can help you achieve all of that and more. And not so incidentally, save your back.

Greg Ingram, regional vice president for New York

Get in focus with... ViewSonic® on top!

Power: A powerful presentation demands a powerful, digital projector like the ViewSonic PJL830. For example, 575 ANSI Lumens guarantees brilliant projection and 400:1 contrast ratio ensures the clearest text and crisp images. A dependable UHP lamp rated at 2,000 hours provides consistent performance and stays brighter longer. All at the standard 800 x 600 resolution.

Light Weight: Ultra-compact and weighing just 10 lbs., the PJL830 is the ultimate in portability.

Digital Light Processing: ViewSonic's first Digital MicroMirror Device (DLP) projector. This new technology facilitates brighter, richer, more uniform color images to help turn your presentation into a homerun. DLP technology is also featured in our higher resolution PJL1030.

Confidence: Buy your projector with confidence from the display company that's won over 500 industry awards. **At ViewSonic, we offer the #1 best selling monitors and flat panel displays in the U.S.A.***

Any Questions? ***For more information on the company that's won over 500 industry awards visit our website at: www.ViewSonic.com/pcworld***

Model	ViewSonic PJL830	InFocus LP425
Lamp Type	UHP	Metal Halide
Lamp Longevity	2,000 hours	1,000 hours
Zoom	Yes	No
Speaker	10 Watt	3 Watt
Remote Control	Included	Not Included

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DLP

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*Stanford Resources Inc. Quarterly Monitrak Report Q4 '98 and Display Search Quarterly Supply vs. Demand Study: LCD Monitors Q1 '99.

The advanced technology used in today's crop of personal portable projectors will enable you to present your products or convey your ideas in their best light.

City-based SunAmerica Asset Management, a mutual funds dealer, says he travels extensively. He grew tired of lugging around an overhead and a slide projector, so he sought a lighter and less bulky alternative.

"I needed a single lightweight and compact system with great flexibility. And one that would work in a range of lighting conditions," says Ingram. "Anywhere from six to 60 people attend my one-hour presentations, and I don't always have control over the conditions."

DLP's inner core consists of a micromechanical silicon chip that uses an array of microscopic mirrors to reflect light (refractive), Conversely, the technology used in LCD projectors filters the light carrying the image through the LCD (transmissive). Refractive systems offer greater 3-D depth and less visual noise, which allow viewers to see more detail in the image.

However, like many users, Ingram admits that he doesn't care all that much about the projector's technology. "I really just want it to work." And it does. "It helps me to come across as a professional. There's no question that my time is better spent," he adds.

Sometimes, unfortunately, new technology adds to the problem instead of to the solution. Superior technology must consistently deliver consistently superior results at an affordable price. After all, when it comes to effective presentations, seeing is believing.

NEC LT81 PICTURE THIS

Let's face it, a picture is worth a thousand words. Many vendors of high quality projectors have seen the technology light shining from Texas Instruments' DLP technology. In fact, most of the industry's leading projector makers have jumped aboard the DLP bandwagon, and with good reason. DLP projectors are lighter, brighter, with brilliant color and bigger, sharper displays.

When you give a presentation, you want your audience to see a sharp and vividly bright picture. And you'd prefer to do it without hauling a 20-pound projector along with your luggage, laptop, and all those other "on the road" necessities. NEC Technologies's MultiSync LT81 is part of the new LT Series single-chip DLP projector family geared to making life ultraportable for presenters who are on the run. The LT81 features 800 ANSI lumens, a contrast ratio of better than 250:1, and weighs in at 9.9 pounds, bright and light enough to give you superior image quality in a portable package.

The LT100 delivers brilliant and detailed images under any lighting conditions with 1000 ANSI lumens and new AccuBlend technology that lets you display an ultra sharp 1280 x 1024 resolution. It's a cinch to setup and use with on-screen menus, so you can easily adjust for low light situations. It also features wireless remote control with a wireless mouse and laser pointer.

There are enough uncertainties in a million dollar pitch.
Her projector won't be one of them.

With 1000 ANSI lumens and XGA resolution, the new MultiSync® LT100™ has the power to handle any sales presentation.

Do your salespeople have to present in a bright conference room? No problem—our ultra-portables deliver brilliant, detailed images under any condition. They're left with just minutes to set up? Quick and easy connection lets them plug in and play. And the do-everything remote lets your sales professionals run the show from anywhere in the room. Even our InstaCare℠ guarantee prepares them for the unexpected: a replacement within 24 hours, or repairs within 72. When there's a lot riding on a sales presentation, go with a sure thing. MultiSync ultra-portable projectors, featuring the MultiSync LT100 and the SVGA MultiSync LT81.™

NEC

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MOBILE**MANAGER**

continued from page 2

Office, Windows NT-based BackOffice applications, and with third-party tools, and lets you sync with the most popular Contact Managers such as ACT, Lotus, and Goldmine.

LEAVING HOME WITHOUT IT

Kaplan sometimes joins a new group of mobile managers: those who leave their laptops at home. Thanks to a wide range of free, Web-based E-mail services, as well as the growing ubiquity of publicly available Internet-connected computers, traveling businesspeople can stay in touch via E-mail while lightening their carry-on load.

On a recent ski vacation, Kaplan stayed with friends in Jackson Hole, Wyo., but didn't lose touch with the office. "I didn't want to bring my laptop, but I needed to keep up with E-mail while I was gone," he says.

After skiing one day, Kaplan located a "Web café" in the resort city, bought himself a cup of coffee, and sat down to read his E-mail on the Website of the public mail service.

"I really like the 'kiosk' model of getting mail," Kaplan says. "I think remote-access E-mail is a notion that will be eventually phased out."

Of course, such services will become even more functional when companies like Aventail deliver even more-robust security features, like smart cards and secure identification tokens to verify remote users.

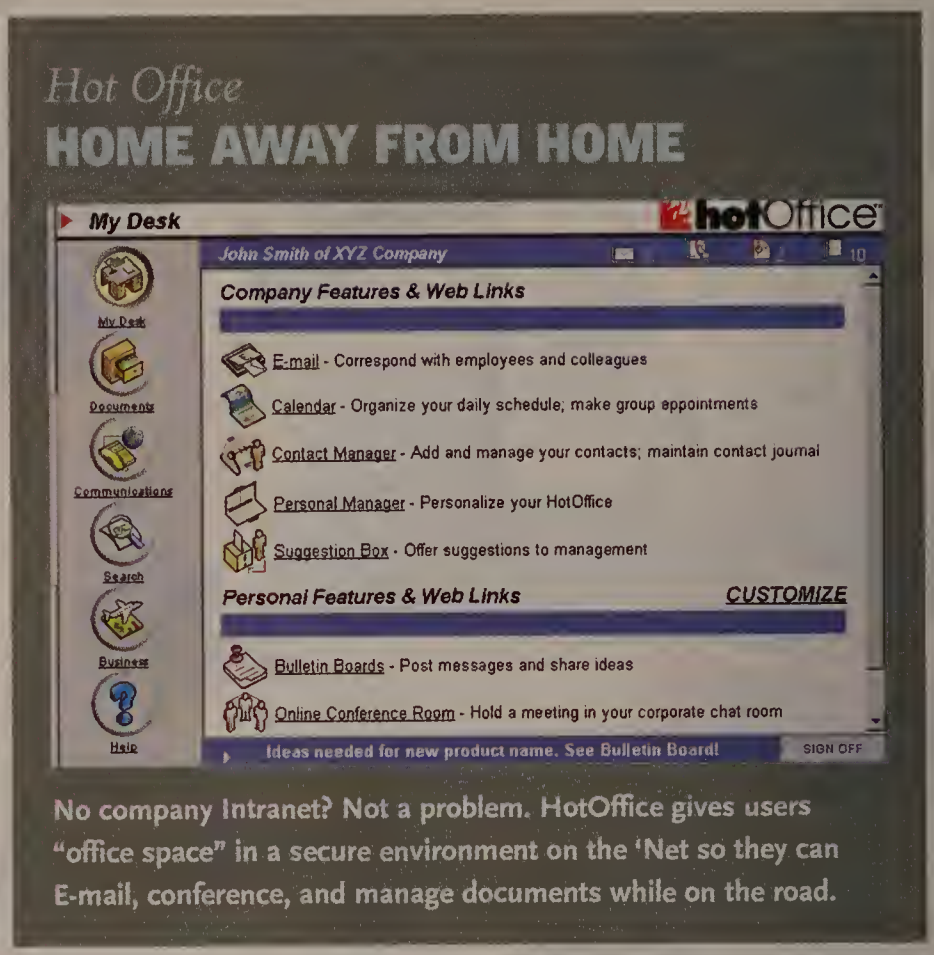
IMATION SUPERDISK

And E-mail isn't the only application that is being Web-enabled. Online banking and check-paying services are already gaining widespread acceptance, while newer services like online scheduling and planning are just beginning to appear. Though Kaplan doesn't yet use a Web-based scheduling application, he uses online check-paying and banking services to keep his personal financial affairs in line, no matter where his business travels take him.

Luckily, there are convenient ways to carry massive amounts of data along with you on the road. For example, SuperDisk drive and diskettes (what everyone is calling "the new floppy,") from Oakdale, Minn.-based Imation Corp. let you store programs and files on one convenient disk. You can easily backup entire directories, programs, or large graphic files without the worry of "how will I ever get them all on one floppy!" SuperDisk holds 120MB, 83 times more then the standard 1.44 MB disk, and is backward-compatible so you can still use your older diskettes.

SMALLER STILL

While Web-based scheduling applications are still in the process of taking off, small devices known as personal digital assistants, or PDAs, that can carry schedules, addresses, and other information certainly have. PDAs, including several based on Windows CE, are winning fans who want to keep their Rolodex and scheduling information in their pocket. Most leading models feature a way to synchronize PDA data with



No company Intranet? Not a problem. HotOffice gives users "office space" in a secure environment on the 'Net so they can E-mail, conference, and manage documents while on the road.

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similar applications on a PC, thereby eliminating the need to enter the same information in both places.

While PDAs are most attractive for their easy-to-use, built-in applications for storing scheduling information and phone numbers, the near-term future for most product lines will include the ability to transmit E-mail, sometimes via a wireless connection. Already, 3Com Corp. has shown a Palm VII unit with built-in wireless access, which is expected to debut late this year. And other manufacturers are planning to combine PDAs with cellular phone functionality, and vice-versa. Still other manufacturers are souping up the performance of pager units, with several available now featuring limited E-mail and reply functionality.

THE CELLULAR PHONE HAS GONE FROM BEING A STATUS SYMBOL TO A MONEY-SAVING NECESSITY.

RING, RING

The constant companion for almost every mobile manager is the cellular phone, a device that has gone from something that was once mostly a status symbol to a service that can actually save money. While the size and weight of most phones has dropped to a fraction of what they previously were, what's more important is the drop in pricing and the addition of features to many service plans that make cellular phone use on the road a no-brainer.

Kaplan uses his cell phone constantly, often surpassing the 1,500 monthly minutes included in his calling plan. But he isn't heavily taxed for his wireless conversations, since his service provider has free nationwide long distance and roaming, two services whose fees can add hefty charges onto other plans. In fact, sometimes it's even cheaper for Kaplan to make a call from his cell phone than from a landline phone, leading him to believe that the days of one phone, one number, are not far off.

"If the reception and quality were just a little bit better, I don't see why I would need a home phone," Kaplan says. Of course, having just one number would eliminate a headache that still plagues many mobile managers: the necessity to manage a number of different voice mailboxes.

CHECK 'EM ALL

Kaplan, like many mobile professionals, has three voice mailboxes: one at home, one at work, and one for his cellular phone. Though several services seeking to provide unified voice mail have been introduced, no single method has achieved any critical mass. Several Web-based options are also in the works, including ones that purport to make E-mail and voice mail accessible via calling or vice-versa. Many cell phones sold today have larger screens that can be used to display short text messages and even truncated Web pages. But Ka-

JOHN HOLLINGSWORTH

CALL HIM MOBILE MAN! Aventail Corp.'s Evan Kaplan stays effortlessly connected while on the road by using the latest web-based mobile technology.

supplement continued on page 336.

An 8.2 pound projector from Sony.

Act surprised.

Okay, so Sony's been putting good things in small packages since the Walkman® personal stereo made history some 20 years ago. But the Ultra Personal™ projector is getting people to do more than just listen. With 600 ANSI lumens of brightness and XGA resolution, this lightweight projector boasts some of the most brilliant images to ever hit the road. Which means the Ultra Personal projector looks as impressive on screen as it does in the overhead bin. So you can make a little history of your own.

Ultra Personal VPL-XC50U / VPL-SC50U

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SONY

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Who will be left standing?

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intel inside pentium® III

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"It's my turn to go online." "No, it's my turn." "Is not!" "Is too!" Was this what the Internet promised? The people at Compaq don't think so. That's why we created these new Compaq Presario 5600 Internet PCs. They're the first computers with Home Phoneline Networking,[7] which lets you plug your family's PCs into your home's phone jacks. This allows everybody to surf the Net at the same time, on the same phone line.[9] So while dad e-mails his college roommate, the kids can visit their school's Web site. You can also share printers, files, and games. And there's more, like one-touch Internet access and 50 free hours on the Net.* And with our 6.0Mb Max Digital Modem,[6] which works with your 56K dial-up access sources, you can switch to DSL service for lightning-fast surfing as soon as the service becomes available in your area. Plus, this modem together with the DSL service will let you talk on the phone while you're online. Of course, these PCs are loaded with tons of other great features, like Intel® Pentium® III processors, thrilling 3D graphics, DVD- or CD-ROM drives, and more — all at an incredible value. So now, your family can e-mail, download, and surf in a whole new way: peacefully.

PRESARIO 5600i-500/3 INTERNET PC

- Intel Pentium III Processor, 500 MHz
- 128 MB SyncDRAM expandable to 384 MB
- 13.0 GB UltraDMA Hard Drive[1]
- 6X DVD-ROM Drive[5]
- Diamond Viper 550 AGP w/16 MB SDRAM
- Aureal 8820 PCI Audio Card
- 56K ITU V.90 Modem[2]
- JBL Pro Premium Speakers w/ Subwoofer
- Digital Creativity Imaging Center[3]
- 10 Mbps Ethernet Port, Cable Modem Ready[8]
- Microsoft Featured Home Collection + MS® Word
- Microsoft Windows98
- Compaq V720 17" Monitor (15.9" VIA)

$2199 As low as $75 per month†

- 16.8 GB UltraDMA Hard Drive:[1] Add $89
- Diamond Monster Sound MX300 PCI Audio Card: Add $39
- Compaq V910 19" Monitor (18.0" VIA): Add $170

PRESARIO 5600i-450/3 INTERNET PC

- Intel Pentium III Processor, 450 MHz
- 128 MB SyncDRAM expandable to 384 MB
- 13.0 GB UltraDMA Hard Drive[1]
- 52X True X CD-ROM Drive[4]
- 2X AGP Graphics w/8 MB SDRAM
- Aureal 8820 PCI Audio Card
- 56K ITU V.90 Modem[2]
- JBL Pro Speakers
- Digital Creativity Imaging Center[3]
- 10 Mbps Ethernet Port, Cable Modem Ready[8]
- Microsoft Office 97 Small Business Edition
- Microsoft Windows98
- Compaq V720 17" Monitor (15.9" VIA)

$1999 As low as $68 per month†

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- Diamond Viper 550 AGP w/16 MB SDRAM: Add $60
- Iomega Zip Built-In™ Drive with 1 disk: Add $79

PRESARIO 5600i-450/3 INTERNET PC

- Intel Pentium III Processor, 450 MHz
- 128 MB SyncDRAM expandable to 384 MB
- 13.0 GB UltraDMA Hard Drive[1]
- 52X True X CD-ROM Drive[4]
- 2X AGP Graphics w/8 MB SDRAM
- Aureal 8820 PCI Audio Card
- 56K ITU V.90 Modem[2]
- JBL Pro Speakers
- Digital Creativity Imaging Center[3]
- 10 Mbps Ethernet Port, Cable Modem Ready[8]
- Microsoft Featured Home Collection + MS Word
- Microsoft Windows98
- Compaq V720 17" Monitor (15.9" VIA)

$1899 As low as $65 per month†

- 6.0Mb Max Digital Modem:[6] Add $99
- Iomega Zip Built-In™ Drive with 1 disk: Add $79
- Diamond Monster Sound MX300 PCI Audio Card & JBL Pro Premium Speakers w/Subwoofer: Add $89

PRESARIO 5600i-400 INTERNET PC

- Intel Pentium II Processor, 400 MHz
- 64 MB SyncDRAM expandable to 384 MB
- 10.0 GB UltraDMA Hard Drive[1]
- 52X True X CD-ROM Drive[4]
- 2X AGP Graphics w/8 MB SDRAM
- Aureal 8820 PCI Audio Card
- 56K ITU V.90 Modem[2]
- JBL Pro Speakers
- 10 Mbps Ethernet Port, Cable Modem Ready[8]
- Microsoft Featured Home Collection + MS Word
- Microsoft Windows98
- Compaq V720 17" Monitor (15.9" VIA)

$1499 As low as $51 per month†

- 128 MB SyncDRAM: Add $120
- Iomega Zip Built-In™ Drive with 1 disk: Add $79
- Home Phoneline Networking:[7] Add $49

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Win List • **PRESARIO 1900 SERIES**

October 1998 **EQUIP MAGAZINE**
5 Star Rating and Best Overall Notebook Award • **PRESARIO 1650**

PRESARIO 1900-366 INTERNET NOTEBOOK PC	**PRESARIO 1900-333 INTERNET NOTEBOOK PC**
Intel® Pentium® II Processor, 366 MHz	Intel Pentium II Processor, 333 MHz
13.3" TFT Active Matrix Display	13.3" TFT Active Matrix Display
64 MB SyncDRAM expandable to 192 MB	64 MB SyncDRAM expandable to 192 MB
10.0 GB UltraDMA Hard Drive[1]	4.0 GB UltraDMA Hard Drive[1]
2nd-Generation DVD-ROM Drive[4]	2nd-Generation DVD-ROM Drive[4]
256-bit AGP Accelerated 3D Graphics w/2.5 MB VRAM	256-bit AGP Accelerated 3D Graphics w/2.5 MB VRAM
56K ITU V.90 Modem[2]	56K ITU V.90 Modem[2]
Smart Lilon Battery	Smart Lilon Battery
256 KB Integrated "On-chip" cache	256 KB Integrated "On-chip" cache
Folio Carrying Case	Microsoft Featured Home Collection
Microsoft® Office 97 Small Business Edition®	Microsoft Windows9B
Microsoft Windows®9B	
$3299 As low as $112 per month[7]	**$2599** As low as $89 per month[7]
Personalize with these options:	
4X DVD-ROM Drive:[5] Add $100	96 MB SyncDRAM: Add $100
128 MB SyncDRAM: Add $200	6.4 GB UltraDMA Hard Drive:[1] Add $150
Xircom 10/100 Ethernet PC Card: Add $169	Stylish Briefcase: Add $119

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Hey, even the good old days were never this good. Because now you can have a movie theater on your lap. Your clients in the palm of your hand. And the world at your fingertips. All you need is the new Compaq Presario 1900 Internet Notebook PC. Amazingly, it's two computers in one. A fully loaded next-generation notebook. And one of the lightest, sleekest computers you've ever tucked under your arm. How did we manage to create both? A revolutionary new feature: the removable drive wedge.

Have it all without carrying it all.

We created a precision-engineered wedge that contains a DVD-ROM, floppy drive, and port replicator connector. With the wedge on, you've got the ultimate, all-in-one multimedia notebook. Snap off the wedge and you've got a lean, mean, 1.2-inch-thick notebook that weighs in at only 5 lbs. (Which is a good thing when you're sprinting for a plane.) Either way, you'll have a notebook with one-touch Internet access, outrageous graphics, a high-speed modem, and a large, vibrant screen. So get one today. But hurry — they're moving fast.

PRESARIO 1900-300 INTERNET NOTEBOOK PC	PRESARIO 1600i-366 INTERNET NOTEBOOK PC	PRESARIO 1600i-333 INTERNET NOTEBOOK PC	PRESARIO 1600i-300 INTERNET NOTEBOOK PC
Intel Pentium II Processor, 300 MHz	Intel Pentium II Processor, 366 MHz	Intel Pentium II Processor, 333 MHz	Intel Pentium II Processor, 300 MHz
13.3" TFT Active Matrix Display	14.1" TFT Active Matrix Display	14.1" TFT Active Matrix Display	13.3" TFT Active Matrix Display
64 MB SyncDRAM expandable to 192 MB	128 MB SyncDRAM expandable to 192 MB	64 MB SyncDRAM expandable to 192 MB	64 MB SyncDRAM expandable to 128 MB
4.0 GB UltraDMA Hard Drive[1]	6.4 GB UltraDMA Hard Drive[1]	4.3 GB UltraDMA Hard Drive[1]	4.3 GB UltraDMA Hard Drive[1]
24X Max CD-ROM Drive[3]	24X Max CD-ROM Drive[3]	2nd-Generation DVD-ROM Drive[4]	24X Max CD-ROM Drive[3]
256-bit AGP Accelerated 3D Graphics w/2.5 MB VRAM	256-bit AGP Accelerated 3D Graphics w/2.5 MB VRAM	256-bit AGP Accelerated 3D Graphics w/2.5 MB VRAM	256-bit AGP Accelerated 3D Graphics w/2.5 MB VRAM
56K ITU V.90 Modem[2]	56K ITU V.90 Modem[2]	56K ITU V.90 Modem[2]	56K ITU V.90 Modem[2]
Smart Lilon Battery	Smart Lilon Battery	Smart Lilon Battery	Smart Lilon Battery
256 KB Integrated "On-chip" cache	256 KB Integrated "On-chip" cache	256 KB Integrated "On-chip" cache	256 KB Integrated "On-chip" cache
Microsoft Featured Home Collection	Folio Carrying Case	Microsoft Office 97 Small Business Edition	Microsoft Featured Home Collection
Microsoft Windows98	Microsoft Office 97 Small Business Edition	Microsoft Windows98	Microsoft Windows98
	Microsoft Windows98		
$2299 As low as $78 per month†	**$2999** As low as $102 per month†	**$2599** As low as $89 per month†	**$1999** As low as $68 per month†
6.4 GB UltraDMA Hard Drive:[1] Add $150	192 MB SyncDRAM: Add $200	128 MB SyncDRAM: Add $200	14.1" TFT Active Matrix Display: Add $100
Extra AC Adapter: Add $49	2nd-Generation DVD-ROM Drive:[4] Add $200	Port Replicator: Add $129	2nd-Generation DVD-ROM Drive:[4] Add $200
External Iomega® Zip® Drive: Add $149	Port Replicator: Add $129	Tripp Lite 140 Watt Inverter: Add $49.95	Tripp Lite Super Notebook Protector: Add $14.95

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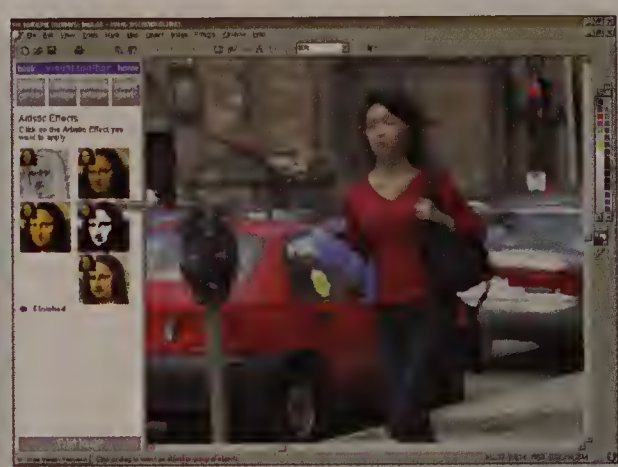
NEW PRODUCTS

Graphics Face-Off: New Suites From Corel and Micrografx

CORELDRAW 9'S NATURAL-MEDIA drawing tools simulate the look and feel of a real brushstroke.



THE VISUAL TOOLBAR (right side of screen) steers you through many of IGrafx Business's features.

GRAPHICS

POWER VERSUS simplicity—it's a trade-off that's as old as software itself, and two new graphics suites tackle it in very different ways. Corel's **CorelDraw 9** boosts the capabilities of an already professional-strength, feature-packed product, while Micrografx's **IGrafx Business 1** puts a friendly face on a less potent (but a still capable) set of tools aimed at businesspeople.

COREL'S WINNING UPGRADE

AT FIRST GLANCE, CorelDraw 9 and Photo-Paint, its bundled image editor, look much like their predecessors. But Corel has made dozens of welcome tweaks to help the package retain its standing as a top choice for intermediate to advanced home and business users. Among my favorites in a preproduction copy is the new so-called artistic-media tool that lets you draw with a tapered, brushlike line, yielding computer art that doesn't look like computer art. Also outstanding is Photo-Paint's profusion of new special-effects filters, including ones that simulate the look of watercolors, pen and ink, and even stained glass. (Many of these effects can also be applied directly within CorelDraw.)

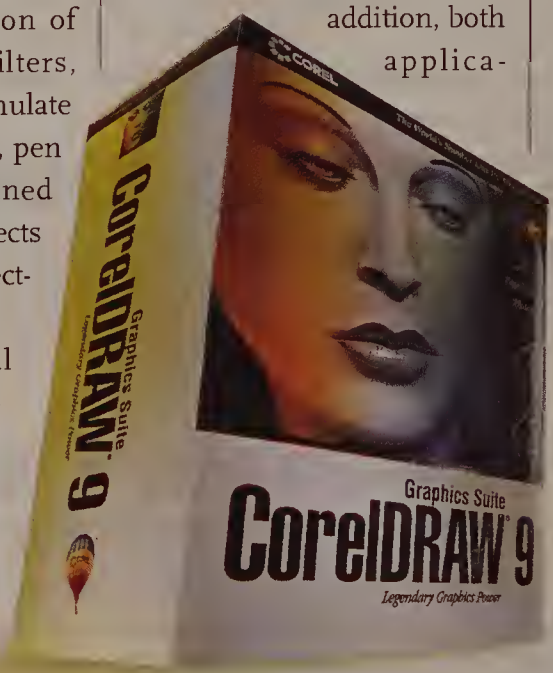
As a purely practical refinement, both CorelDraw and Photo-Paint now let you work with multiple color palettes (say, the Pantone palette used by graphics pros and Netscape Navigator's palette for displaying Web graphics) simultaneously. This is a boon when you're creating a single graphic for use in multiple media. In addition, both applications can export files in PDF format, permitting anyone with a copy of Adobe's free Acrobat Reader to view and print your creations.

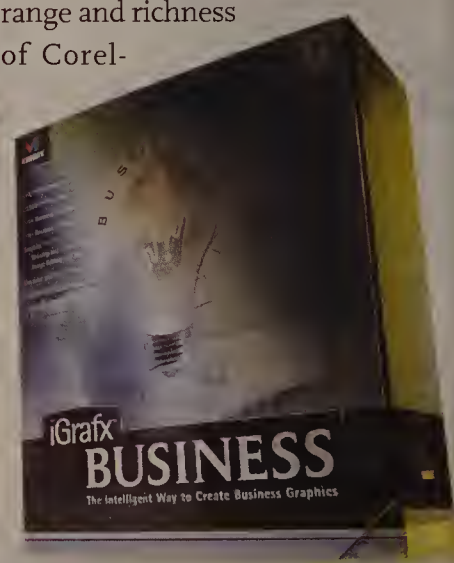
Dropped from CorelDraw 9 is a 3D graphics application called CorelDream 3D that was in the previous edition but was never a highlight.

CorelDraw 9 lists for $695 (the same cost as the previous edition), and it comes with Corel's usual cornucopia of fonts, clip art, and supporting utilities, including Canto's Cumulus image browser, a useful app for organizing and finding images anywhere on your hard disk.

INTRODUCING IGRAFX

MICROGRAFX has really gone back to the drawing board with IGrafx Business, which differs substantially from its immediate forebear, Micrografx Graphics Suite. Aimed at business users who aren't graphics experts, IGrafx offers a versatile collection of tools but doesn't match the overall range and richness of Corel-





BIG DEALS: CorelDraw 9 includes Photo-Paint; IGrafx Business has four apps.

PHOTOGRAPH: MARC SIMON

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114 AEC Software FastTrack Schedule 6.01, CompuServe 2000

CorelDraw 9

PRO: Many new and improved features (filters, PDF output, and so on).
CON: Pricier than IGrafx, no longer offers 3D module.
VALUE: Solid upgrade to a winning graphics tool kit for advanced users.
List price: $695; upgrade from previous version or competition, $199.
Corel
800/772-6735
www.corel.com
PRODUCT INFO NO. 726

IGrafx Business 1

PRO: Simple interface, helpful wizards, low price.
CON: Fewer advanced features than CorelDraw, could use more templates.
VALUE: Good option for intermediate users.
List price: $199
Micrografx
888/744-1210
www.micrografx.com
PRODUCT INFO NO. 727

Draw 9's offerings. Still, it has the edge in two important respects: It's easier to use and, at $199, it's much cheaper. I reviewed a shipping copy.

The suite provides integrated modules for drawing and making flowcharts, for image editing, for producing 3D graphics, and for managing image files. You can accomplish most common tasks with the Visual Toolbar, which provides you with simple, intelligible, step-by-step explanations. Also helpful is the generous supply of wizards, including ones for preparing images for the Web and for creating 3D animation effects.

IGrafx Business would be even more inviting if it contained more templates, and if its IGrafx Share image browser module didn't unaccountably lack the simple Visual Toolbar interface. Despite these drawbacks, this bundle's a good fit for folks in the market for midrange graphics power at a midrange price.

—*Harry McCracken*

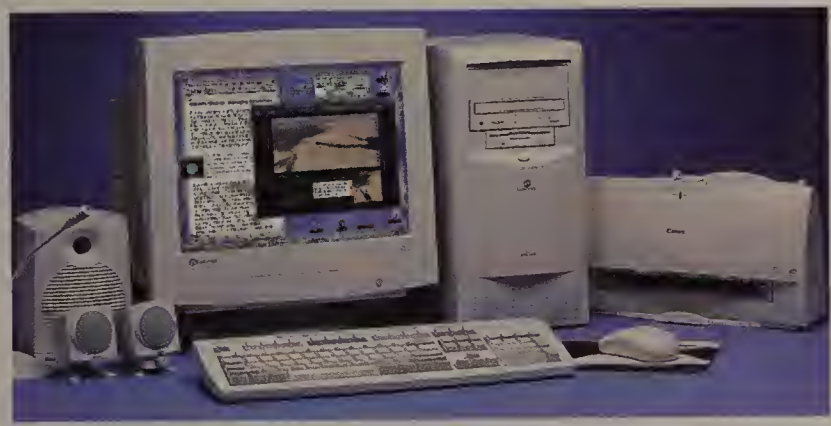
Gateway Selects AMD K6-2 Processors

DESKTOP PC

WHO SAYS YOU can't teach an old cow new tricks? Gateway has introduced the Select line of PCs, based on AMD K6-2 processors. We tested a shipping version of the **Gateway Select 400**, an affordable system built around a K6-2-400.

Configured with 64MB of RAM and an integrated ATI 3D Rage Pro Turbo AGP graphics chip with 8MB of video memory, this $1299 midsize tower turned in a PC WorldBench 98 score of 188, one of the best scores we've seen for a system based on this CPU. Performance was on a par with that of similarly configured Celeron-400–based PCs—and just 6 percent slower than the average of costlier Pentium II-400s with 64MB of RAM. Most users won't notice the difference when running standard business applications.

Geared for beginners, the Select 400 also features such well-conceived extras as CD and volume controls and one-touch Internet buttons on the keyboard. The V.90 modem, 13X–32X CD-ROM drive, and Altec Lansing AC100 speakers are typical components for PCs in this price range, but Gateway's 17-inch monitor and 8.4GB hard disk exceed the norms for entry-level systems.



NO INTEL INSIDE: The speedy $1299 Gateway Select 400 desktop is part of the first Gateway PC line to be based on AMD's K6-2 CPUs.

Then again, the small case and tiny motherboard leave little room for expansion. Only two of the three PCI slots are free. Moreover, the system has no ISA slots and just one empty 5.25-inch external bay. For software, you choose between Microsoft's Works office suite or Corel's fuller-featured WordPerfect Office 8, and you get basic versions of Quicken 99 and McAfee antivirus software.

Gateway offers a year of free Internet access via its gateway.net service. But you get just a one-year warranty on parts and labor, plus a year of around-the-clock toll-free tech support for the hardware (90 days for software). A three-year parts and labor warranty costs $199 more. Overall, the Select is a good choice for offices with limited space or for entry-level users who want more performance (say, for 3D games) and a better display than sub-$1000 systems offer.

—*Jon Jacobi* ▶

online

FOR MORE PRODUCT news and the latest announcements, check out the PC World Daily News Service at www.pcworld.com/news.

Gateway Select 400

PRO: Good performance, small profile, 17-inch monitor, large hard disk.
CON: Little room for expansion, no ISA slots for legacy cards.
VALUE: Solid entry-level system from top-tier vendor.
Street price: $1299
Gateway
800/315-2536
www.gateway.com
PRODUCT INFO NO. 728

HP's Sub-$2000 Celeron-333 Notebook

NOTEBOOK PC

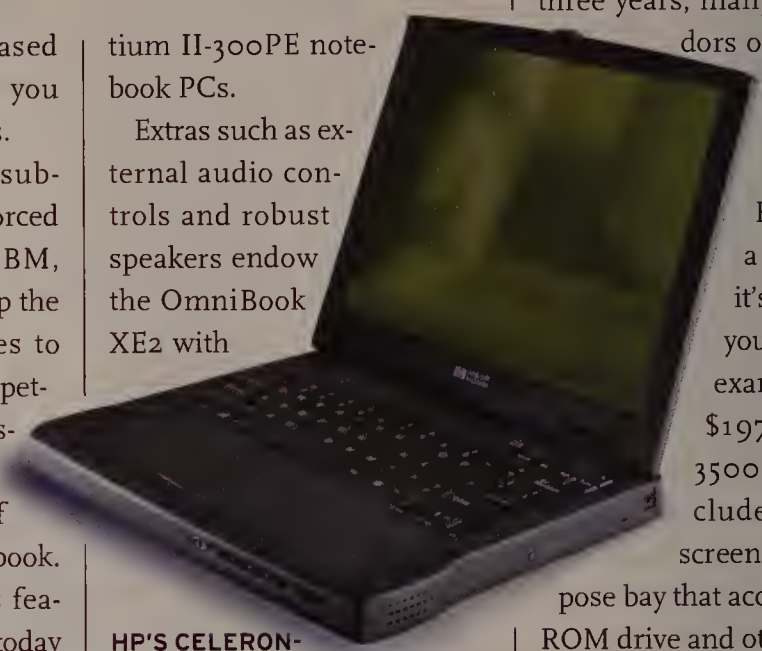
WITH ITS OmniBook XE series, Hewlett-Packard joins the ranks of major notebook vendors offering sub-$2000 portables for business users. But while the fast performance of the $1849 **OmniBook XE2** makes it a fine computer for most business tasks (it's the first Celeron-333–based notebook we've tested), you can find even better deals.

The advent of the sub-$1000 desktop PC has forced notebook makers like IBM, Gateway, and Dell to drop the prices of their portables to below $2000 to stay competitive; even mobile professionals may not be able to justify paying the cost of three desktops for a notebook.

The OmniBook XE2's features typify what you get today at this low price: a Celeron-333 CPU, 64MB of RAM, a 12.1-inch active-matrix screen, internal V.90 modem and CD-ROM drive, a 4GB hard drive, and a one-year parts and labor warranty.

Performance doesn't suffer, either: Our shipping unit ran up a PC WorldBench 98 score of 166, on a level with Pentium II-300PE notebook PCs.

Extras such as external audio controls and robust speakers endow the OmniBook XE2 with a consumerish look and feel reminiscent of IBM's sub-$2000 ThinkPad I series. Too bad HP put the OmniBook XE2's speakers so close to the wrist rest. This juxtaposition can muffle sound slightly when you type and listen to tunes at once. HP also cuts off free technical support after three years; many other vendors offer lifetime support.



HP'S CELERON-333-based OmniBook XE2 is speedy and fairly priced.

Although the OmniBook XE2 is a good deal, it's not the best you can get. For example, Dell's $1979 Inspiron 3500 C333XT includes a bigger screen, a multipurpose bay that accepts a DVD-ROM drive and other optional devices, and a three-year parts and labor warranty. But you can't go wrong selecting either of these budget portables. If you need a notebook primarily for routine word processing and spreadsheet work, about the only mistake you can make these days is paying more than two grand.

—Vince Bielski

HP OmniBook XE2

PRO: Speedy, won't break the bank, powerful speakers, external volume controls.

CON: Free technical support limited to three years, hands may muffle sound when typing.

VALUE: Offers the performance and most of the features that business users need, for under $2000.

Street price: $1849

Hewlett-Packard

800/322-4772

www.hp.com

PRODUCT INFO NO. 729

Lightware's Ultralight LCD Projector

PROJECTOR

LIGHTWARE'S **Scout** LCD projector is smaller than a phone book and relatively inexpensive at $2995. Weighing a tad over 5 pounds (case and cables double that figure), it's the first of a new generation of super-lightweight data projectors that promise to beef up the mobile presentation arsenal.

The Scout comes with built-in stereo speakers, a barebones remote control (no mouse buttons or laser pointer), and a carrying case. Its 200-watt, 1000-hour metal-halide lamp is rated at 500 ANSI lumens, bright enough for presentations in most small conference rooms. But you have to make do with a fixed, manual focus lens, as opposed to the automatic-focus and zoom lenses on more expensive models.

LIGHTWARE'S SCOUT is lightweight and affordable, but image quality could be better.

A preproduction unit was easy to set up and use. My only complaints: You can adjust color and tint only when using a video source (like a TV), not when using a PC connection. Also, projected images looked pale and washed out, even compared to those produced by other budget data projectors. Lightware says the shipping version will use a higher-quality LCD panel that should produce brighter, uniformly lit images.

In other respects, the Scout has a lot going for it. It's the most compact and one of the least expensive LCD projectors to date, and it's bound to make a good travel companion for price-sensitive mobile pros.

—Richard Jantz ▶

Scout

PRO: Great price, highly portable, easy to use, includes remote control.

CON: Lackluster color, limited color controls, no zoom lens.

VALUE: An excellent price for an ultraportable projector.

Street price: $2995

Lightware

800/445-9396

www.lightware.com

PRODUCT INFO NO. 730

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Pentium III Talks: Point & Speak 3.52

SPEECH RECOGNITION

UNTIL NOW, training speech recognition software has been time-consuming and laborious. Dragon Systems' $49 **Point & Speak 3.52**, the first Pentium III–optimized dictation package to hit the market, slashes the time between opening the box and actually using the product. In my tests, a preproduction copy running on a PIII-450 with 128MB of RAM required only 5 minutes of reading and 2 minutes more to process the speech files, compared to half an hour of reading and several minutes for file processing on previous-generation products.

Accuracy and speed were also very impressive. My first dictation attempts—a business letter, newspaper articles, and short e-mail messages using Microsoft Word and NotePad—delivered 88 percent accuracy; later I consistently obtained 94 percent accuracy.

Point & Speak 3.52 recognized words and phrases like "O'Keefe," "Ameritech," and "Q1 1998" right off the bat. It made some minor boo-boos—rendering "standard" as "under," and "are" as "or"—possibly because of my Irish accent. The program correctly interpreted most punctuation instructions, though "colon" became "code" or "coated."

Point & Speak works with Microsoft Office, WordPerfect, AOL, Lotus Notes, and other packages involving text entry. However, you can't use it to open, close, or otherwise control applications, and you must correct or format text manually. Also, you have to install the product on a Pentium III PC with at least 48MB of RAM.

Pentium III–optimized packages by IBM, Lernout & Hauspie, and Philips are due later this year. But if your dictation needs are basic and you're investing in a PIII machine anyway, this is the best deal for the money right now.

—Aoife McEvoy

Point & Speak 3.52

PRO: First PIII-optimized dictation package needs only 5 minutes of training; impressive accuracy.

CON: Straight dictation only, no formatting or app control options; PIII system required.

VALUE: Basic dictation with great results at a good price—if you've got the hardware.

Street price: $49

Dragon Systems

800/437-2466

www.dragonsys.com

PRODUCT INFO NO. 713

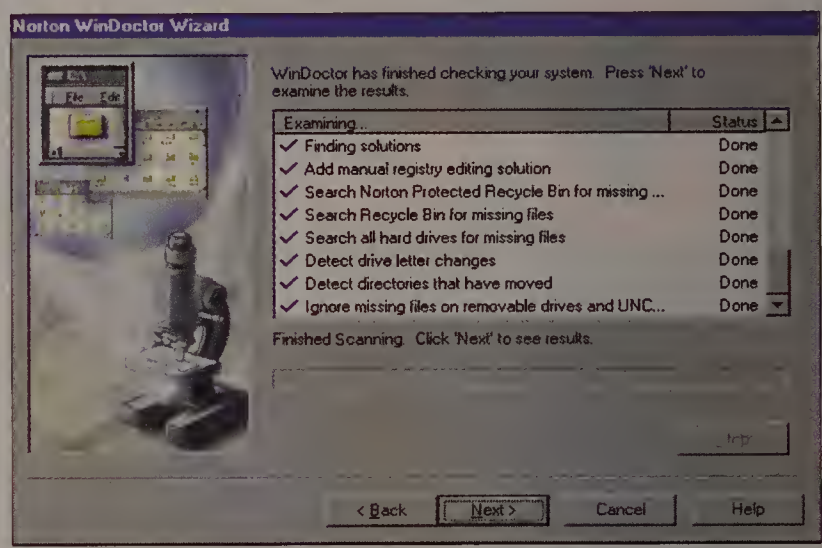
SystemWorks 2: The Big Sweep

UTILITY

WINDOWS FILE systems tangle up and melt down so often that keeping your PC in working order can quickly become a second job. **Norton SystemWorks 2** is a first-rate tool kit for just that chore. Its easy-to-use desktop panel provides access to the current versions of Norton Utilities, AntiVirus, CleanSweep, CrashGuard, and Web Services. I evaluated a shipping copy.

Depending on how much of it you install, the $70 suite gobbles 130MB to 160MB of hard disk space, but its components can remove at least that much Windows and Web junk. Start with WinDoctor to sweep up common Windows detritus: shortcuts to erased apps, lost ActiveX code strings, and post-crash file fragments. This version of WinDoctor cleans up corrupted Windows Registry entries (often resulting from system hang-ups) better than its predecessor did.

Similarly, the new CleanSweep tidies up orphaned and duplicate files. It's much better at uninstalling all of an application's components than Windows' Add/Remove Programs. SystemWorks 2 also resurrects WipeInfo, Norton's once-popular DOS tool for removing all traces of erased files from your hard drive.



UP CLOSE AND PERSONAL: SystemWorks' WinDoctor component scrutinizes everything from shortcuts to Windows Registry entries.

CrashGuard gives you the best shot yet at saving your work and reviving crashing applications. It can even drop you back to where you were on the Internet when your apps crashed. And Norton AntiVirus 5.0 throws in a year of virus immunization updates, plus protection against rogue ActiveX code and Java applets that can scramble hard drives or permit data theft.

SystemWorks' memory-resident monitors can conduct regular maintenance automatically. But load selectively: The suite can be intrusive and hog resources. Better to opt for, say, AntiVirus and CrashGuard and run other tools periodically by clicking on the easy-to-follow wizards.

—Mike Hogan ▶

Norton SystemWorks 2

PRO: All the tools you need to keep your PC safe and running in top form.

CON: Can be resource-intensive and intrusive.

VALUE: A must-have for any PC running Windows.

Street price: $70 ($60 for current owners of any Norton product)

Symantec

800/441-7234

www.symantec.com

PRODUCT INFO NO. 714

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*See policy for details. Model Pro8T2 shown in photo, which carries a $10,000 Equipment Protection Policy.

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New Digital Cameras Deliver Mega-Shots

DIGITAL CAMERAS

ALTHOUGH SOME of the latest digital cameras are small enough to fit in your shirt pocket, their prices may bore a hole through it. Svelte new models from Nikon and Olympus deliver beautiful, ultrahigh-resolution images, but each of them carries a hefty $999 price tag.

BIG PICTURES, small camera: The Olympus C-2000 Zoom.

Both the new black, magnesium-encased Nikon **Coolpix 950** and the slightly chunkier, silver-and-black Olympus **C-2000 Zoom** feature 2-megapixel resolution, which means that they allow you to capture photographs of up to 1600 by 1200 resolution. (Okay, so that translates to only 1.92 million pixels, but that is still a pretty impressive number.) The two models produce handsome pictures, even in huge 11-by-14-inch prints, but the Coolpix 950's image quality comes out slightly superior.

Coolpix 950

PRO: Easy-to-use digital camera produces sharp, colorful photos.

CON: Pricey.

VALUE: Terrific for professionals as well as novices.

Street price: $999

Nikon

800/526-4566

www.nikonusa.com

PRODUCT INFO NO. 715

C-2000 Zoom

PRO: Captures impressive photos.

CON: Pricey; puzzling controls.

VALUE: Compact, point-and-shoot digital camera comes with numerous extras.

Street price: $999

Olympus America

800/622-6372

www.olympusamerica.com

PRODUCT INFO NO. 716

BIG-SHOT FEATURES

BOTH CAMERAS include your basic optical viewfinder, 3X optical zoom lens (Nikon's also rotates so you can take photos at various angles), and a manual mode for controlling settings such as white balance. The Coolpix 950 also lets you attach an optional $150 wide-angle or $180 fisheye lens for capturing 183-degree pictures of large buildings or a group of people.

Nikon's 2-inch and Olympus's 1.8-inch LCD screens both let you easily view single images or tiny but distinct thumbnails of multiple shots, so you can delete the ones you don't like and save precious storage space. In addition, the C-2000 Zoom can magnify an image up to three times so you can examine its details right on the camera's LCD.

In my tests at standard settings, both preproduction units lasted about 2 hours using standard AA batteries. But expect shorter battery life if you use the LCD often, especially for viewing high-res photos. Olympus offers rechargeable NiMH batteries—which last longer than alkalines—and a recharger, for free until July 31 ($50 thereafter).

The Nikon's 8MB CompactFlash card holds 8 uncompressed photos captured at 1600 by 1200 resolution, or up to 199 compressed 640 by 480 images. The Olympus's 8MB SmartMedia card holds up to 122 compressed 640 by 480 images.

You can transfer images to your PC's hard disk via serial cable, but that process takes a while if you're downloading more than a couple of photos, especially hi-res shots. Alternatively, Olympus sells a floppy disk adapter for its SmartMedia card for $100 (you can find cheaper adapters from other vendors), and Nikon's $60 CompactFlash reader slides into a PC Card slot or plugs into a parallel or Universal Serial Bus port.

NIKON'S COOLPIX 950 takes great photos and is easy to use.

You can edit or stitch photographs together to create a panoramic image using each camera's bundled apps: The C-2000 Zoom comes with Adobe PhotoDeluxe and Enroute's QuickStitch; Nikon ships with PictureWorks HotShots and Interactive Pictures Ipix tool for producing 360-degree images.

Hook either of these cameras to a camcorder or TV to use it as a presentation device. The Olympus even has a matchbox-size remote control for flicking through your pictures (or taking new ones) from across the room.

Finding and using all these features can be difficult, but the Nikon's intuitive icons and buttons help you navigate the menus smoothly. On the other hand, the Olympus's cryptic controls are harder to use; you have to read the manual thoroughly before you can operate them and recognize, for instance, that *P* stands for Program, not Play.

Overall, for the best-looking, most vibrant pictures and easy-to-use controls, the Coolpix 950 is your best bet. But if you want a camera that works with a floppy disk adapter and comes with extras such as rechargeable batteries, consider the C-2000 Zoom.

—*Grace Aquino* ▶

The iiyama TrueFlat series. See, and feel, the difference.

The addition of the TrueFlat series to the award-winning family of monitors from **iiyama** is really something to see. Experience for yourself the benefits of these new, flat screen monitors. This advanced technology brings to you a brighter, sharper image that reduces the stress, and strain, on your eyes. With amazing refresh rates, the resolution will provide you with unparalleled viewing performance. Add to this the TCO '99 certification and you'll know why the TrueFlat series of monitors from **iiyama** can make the difference.

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AG pitch 0.25mm center
Horizontal frequency 30–115khz

VisionMaster Pro 510 – $1299 ESP
Resolution 2048 x 1536 @ 80hz
AG pitch 0.25mm center
Horizontal frequency 30–130khz

	CRT Monitor Model/ Viewable Area	TCO	Dot Pitch/ CRT Type	Max. Horizontal Scan Rate	Max. Resolution	Est. Street Price
22"	**VisionMaster Pro 510** (20.0" VIS)	TCO '99	0.25mm/AG	130khz	2048 x 1536@80hz	$1299
21"	**VisionMaster Pro 502** (19.5" VIS) **VisionMaster Pro 501** (19.5" VIS) **VisionMaster 502** (19.5" VIS)	TCO '95 TCO '95 TCO '95	0.28mm/AG 0.28mm/AG 0.22mm/H	110khz 96khz 110khz	1800 x 1440@75hz 1600 x 1200@75hz 1800 x 1440@75hz	$999 $939 $999
19"	**VisionMaster Pro 450** (18.0" VIS) **VisionMaster 450** (18.0" VIS)	TCO '99 TCO '95	0.25mm/AG 0.22mm/H	115khz 102khz	1800 x 1440@80hz 1600 x 1200@80hz	$699 $559
17"	**VisionMaster Pro 400** (16.0" VIS) **VisionMaster 400** (16.0" VIS) **S702GT** (16.0" VIS)	TCO '95 TCO '95 TCO '95	0.25mm/AG 0.26mm/dp 0.28mm/dp	96khz 96khz 96khz	1600 x 1200@75hz 1600 x 1200@75hz 1280 x 1024@85hz	$489 $419 $369
15"	**VisionMaster 350** (13.7" VIS)	MPR-II	0.28mm/dp	69khz	1280 x 1024@65hz	$219

	TFT/LCD Monitor Model	TCO	Pixel Pitch	Max. Horizontal Scan Rate	Max. Resolution	Est. Street Price
14.1"	**Pro Lite 36a** (with OSD)	TCO '95	0.297mm	62.5khz	1024 x 768@75hz	$839
15.0"	**Pro Lite 38a** (with OSD) **Pro Lite 38b** (with OSD, USB & Speaker)	TCO '95 TCO '95	0.297mm 0.297mm	62.5khz 62.5khz	1024 x 768@75hz 1024 x 768@75hz	$1079 $1129
15.4"	**Pro Lite 39e** (with OSD, USB & Speaker)	TCO '99	0.2385mm	80khz	1280 x 1024@75hz	$1999
18.1"	**Pro Lite 46e** (with OSD, USB & Speaker)	TCO '99	0.2805mm	80khz	1280 x 1024@75hz	$3329

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Wireless Wonder: Infrared Modem/Cell Phone

WIRELESS

THOUGH CELLULAR phones with integrated modems are not new, until now none have been truly wireless. They all required a special serial cable to connect the built-in modem to your notebook computer. Ericsson's $299 **CF 888** mobile phone comes with an ingenious work-around: Its infrared port enables instant wireless e-mail, Internet, and fax services to and from the infrared port on your laptop or personal digital assistant.

The slim, 6.3-ounce phone works on either analog or digital GSM 1900 networks; unfortunately, it doesn't work with the PCS digital networks that are more common in this country. The infrared modem on my shipping unit worked flawlessly with a Dell Inspiron 3200 portable. The only difficulty I encountered was finding and assigning a free COM port on the notebook for infrared service.

You can store 99 names and phone numbers—each with a one- or two-digit speed-dial assignment on your phone. Transferring names and numbers from the included personal information manager via the infrared port was a snap.

Modem speed was a leisurely 9600 kbps—okay for faxes and short e-mail messages, but not so great for large file attachments. Battery life, on the other hand, is a sturdy 100 hours of standby time (the unit is turned on and ready to receive calls), or about 5 hours when used for calls. Phone setup is performed with arcane menus accessed by a restrictive three-button panel and viewed on the phone's three-line LCD screen.

The phone's lack of PCS support is a serious drawback. But if you're still on analog service, the infrared modem's high quality makes it a standout as the first truly untethered business communicator.

—Michael S. Lasky ▶

Ericsson CF 888

PRO: Modem/cellular phone with an integrated infrared port offers flawless and truly wireless voice/data connections.

CON: Convoluted setup menus, no PCS support.

VALUE: Excellent choice if you need voice and data connections in locations without land lines.

List price: $299

Ericsson

800/374-2886

www.ericsson.com/us/phones

PRODUCT INFO NO. 717

OmniForm Brings Home the Data

ELECTRONIC FORMS

PAPERLESS office? Hah! Dead trees live on in paper forms. There is another way: Caere's $149 **OmniForm 4** lets you create, distribute, and tabulate forms electronically. New features allow you to save forms for use on the Web and import data from external files. A wizard helps tidy imported forms.

OmniForm can import scanned forms or files from any application. My preproduction copy correctly converted Acrobat IRS forms, even interpreting some elements' functions. For example, it converted boxes labeled "DATE" into date fields. But creating forms from scratch—what a pain! You can't group, shrink or stretch elements, control the spacing between them, or align them precisely.

You can speed up data entry and reduce errors by adding formulas, choice lists (as opposed to blank fields), and serial numbers. For HTML forms, OmniForm generates JavaScript to handle calculations, data validation, and so on—but my beta created HTML forms with JavaScript errors, and it made some fields so big that they covered nearby text.

Data entered in an OmniForm form goes to a flat-file database, which you can search, edit, and export for use in other database apps. But OmniForm has no database server, and setting it up to enter data directly into another database isn't easy.

OmniForm offers a $49 Fill edition for businesses whose employees must fill out lots of forms but don't need to create them. The standard edition can convert forms to double-clickable applications that you can distribute by e-mail. While less convenient than using Fill, this approach worked without a glitch in my tests.

OmniForm is great for converting paper forms and filling them in electronically. But to create precise forms from scratch, you may be better off using a CAD or a high-end graphics package, then exporting the forms to OmniForm.

—Dan Littman

OmniForm 4

PRO: Great features for importing paper forms; Web support.

CON: Design tools lack structure.

VALUE: A lot of software for a very low price.

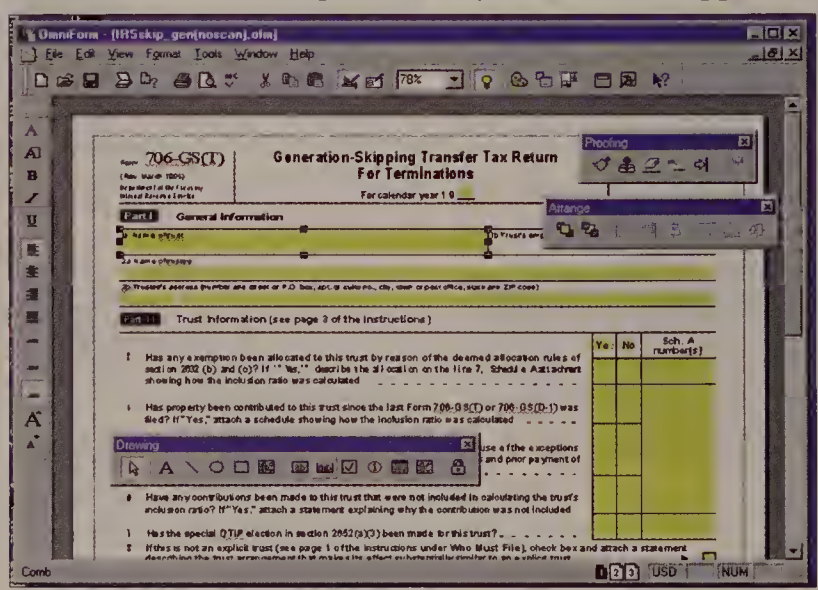
Street price: $149, Fill edition $49

Caere

800/654-1187

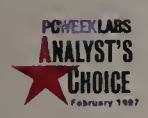
www.caere.com

PRODUCT INFO NO. 718



OMNIFORM 4 correctly interpreted almost all elements of this IRS form—and even underlined suspected spelling errors in red.

VirusScan 4.0. Because every time you open an e-mail, that's not all you're opening.



It's sickening how viruses can wriggle their way into your computer. And destroy your data. Unless, of course, you have VirusScan 4.0.® It detects 100% of those known crevices of the Internet, nasty viruses lurking in the e-mail or on floppy disks. But don't simply take us at our word. SecureComputing Magazine even awarded VirusScan a "Best Buy" award and a 5-star rating— the highest available. Little wonder VirusScan is the choice of 60 million customers and is considered the "clear leader in the anti-virus market" by independent analyst group Dataquest. Install VirusScan today. And open your e-mail, without opening yourself to disaster. For information, call 1-800-332-9966, dept. 1150 or visit www.mcafee.com.

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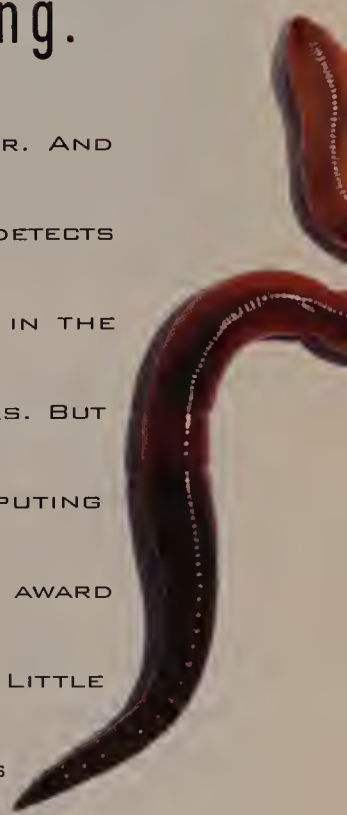

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It Ain't Heavy, It's My Brother

PRINTER

I DON'T like lugging around a lot of office gear when I travel, but Brother's $299 **MP-21C** portable ink jet is worth a little shoulder strain.

Slightly larger than a VHS cassette and weighing 2.2 pounds, the MP-21C sits upright, so it needs less desktop space than its competitors. (The $349 MP-21Cdx adds a 30-page document feeder, AC adapter, and parallel cable.)

The MP-21C's PC Card interface also draws power from the PC—that means no batteries or extra cables. Its *piezo* technology, which pushes ink through nozzles with pressure rather than with heat, also sucks less power than the thermal technology used by all other portable ink jets.

I had problems installing the PC Card driver of a shipping unit; better documentation would've helped (Brother says it's working on this shortcoming). But once installed, everything worked perfectly.

The MP-21C produces readable letters and vivid images on ink jet paper, and rich photos on glossy stock. But it takes more than a minute to print a page of text and over 20 minutes for a high-res photo on glossy stock. I can go mobile—but not quickly.

—*Karen Silver*

NICE LITTLE BROTHER: Brother's MP-21C ink jet delivers good quality and needs less power than other portables—but it prints slowly.

Brother MP-21C

PRO: Small; good print quality.
CON: Weak documentation, slow.
VALUE: Handy mobile printer.
Street price: $299
Brother International
800/276-7746
www.brother.com
PRODUCT INFO NO. 719

QUICK TAKES

Dial Up Your E-Mail

SHARP'S NEW $149 **TelMail TM-20** lets you send and receive e-mail using just about any telephone handset. I simply dialed an 800 number and held a shipping unit against the phone handset to send and receive messages. The device, which resembles a palm-size PC, uses the same $10-a-month PocketMail service and technology as JVC's HC-E100 (*New Products*, December 1998, www.pcworld.com/dec98/portamail), but with TelMail you get a larger keyboard and easier-to-use interface, plus a calendar and phone book (JVC has only a basic phone book). PocketMail can automatically retrieve e-mail from any POP3 account, or receive forwarded messages from corporate or AOL accounts (up to three). The optional $69 Pygmy PocketLynx software synchronizes TelMail and desktop PC data. Sharp; 800/237-4277; www.sharp-usa.com.

PRODUCT INFO NO. 725

—*Andrew Brandt*

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E-MAIL

NOT ALL BULK e-mail is spam. And for businesses with a legitimate need to selectively stay in touch with a large number of customers by standard Internet e-mail, Revnet Systems' $99 **MailKing 2.0** is an invaluable tool.

MailKing creates mailing lists from almost any conceivable source: popular contact managers such as GoldMine or ACT (although you'll have to export data from some versions as text files so that the program can read the e-mail addresses), databases such as Access or Paradox, spreadsheets and delimited text files, even Eudora and Outlook address books. You can easily refresh your contact source list or add individual entries manually. You may filter mailing lists by any characteristic in the database—city, state, zip code, country, or customized fields, for example.

Once you've created your list, you can personalize your messages—mail-merge style—also using database fields. And you can preview each message before mailing it. If you're offline, just send the messages to MailKing's OutBox for transmission later. Using a shipping version, it took me only moments to write and send out a personalized meeting invitation to colleagues in Boston.

In most cases, the on-screen help walks you through each step, but there are occasional exceptions. For example, you must convert some text files to Access (.mdf) format to edit them. MailKing's export feature does the job easily, but the documentation neglects to mention this anomaly.

MailKing 2.0 runs on Windows 95, 98, or NT; your ISP account must have an SMTP server for outgoing mail. E-mail managers abound, but for the money, MailKing offers exceptional power and ease of use.

—*Yardena Arar* ▶

MailKing 2.0

PRO: Easy, affordable e-mail-merge and mailing list creator.
CON: Some files are tricky to work with; documentation doesn't address these exceptions.
VALUE: Great for small businesses with large customer databases.
Street price: $99
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Amorphium: 3D Sculpture Made Easy

3D GRAPHICS

IT SCULPTS, chisels, shapes, and smoothes. No, it's not some all-purpose tool advertised on late-night TV, but a beta copy of Play's new 3D sculpting software, **Amorphium**.

This innovative $150 program makes it easy to manipulate 3D objects with a mouse, in much the same way that sculptors work with clay. Simply take a sphere or other basic object, select a brush, and specify the amount of pressure you wish to apply. Real-time rendering lets you view images instantly. You can move, rotate, and zoom in and out of an image, so it's easy to see what you're doing.

You can modify 3D text with lighting, color, and effects like taper, twist, and—my personal favorite—tsunami (a wave effect). A "potter's wheel" allows you to sculpt an object as it spins. You can also animate 3D text (saved as AVI clips) to use on a Web page or a presentation. The tool lets you open and save images from other graphics programs, too; Amorphium recognizes graphics file formats such as DXF, 3D Studio, and LightWave. Other budget 3D packages offer some of these features, but Amorphium produces exceptionally polished images.

The tool isn't ideal for building real-world objects such as office equipment and automobiles, so graphics pros still need pricier packages such as Caligari TrueSpace. But for anybody new to 3D graphics, Amorphium gives you a very friendly and fun introduction at a reasonable price.

—Grace Aquino

Amorphium

PRO: Innovative 3D graphics package that's easy to use.

CON: Lacks precise controls for graphics pros.

VALUE: Fun and affordable 3D tool.

Street price: $150

Play

800/306-7529

www.play.com

PRODUCT INFO NO. 721

NO WORM REQUIRED: Amorphium burrowed a hole in a supplied 3D image of an apple in seconds. *Creating* objects, however, isn't easy.

Brave New Bryce 4 Worlds

3D GRAPHICS

NAMED AFTER Utah's spectacular Bryce Canyon, MetaCreations' **Bryce 4** generates stunning images, panoramas, and scenes. The new $200 version, which I evaluated in preproduction form, adds the ability to create scenes reminiscent of the surreally beautiful landscapes in the popular games Myst and Riven—and deliver them over the Web as RealPlayer movies or VRML and QTVR scenes. Web site visitors willing to download a MetaStream plug-in can even manipulate and view terrains created using the proprietary MetaStream format.

The new Sky Lab work space gives users greater control over weather simulation. The enhanced Terrain Editor allows you to use a mouse to distort more than 20 terrain families (such as Lava, Mud Cracks, and Ridges) into new land forms. Landscapes can also be tiled seamlessly together or constrained by altitude. Also, Photoshop plug-in support is finally here, along with six Kai's Power Tools 3 effects.

Other improvements let you download and render U.S. Geological Survey maps; share files with professional 3D apps (like Infini-D, TrueSpace, and LightWave); and exchange tips and tricks with other users in real time over the Net using the BryceTalk chat applet.

The software itself looks like a game, with pulsating 3D buttons and a shelf full of objects—spheres, cubes, clouds, mountains, and so on—which you can drag onto the main work space. Place your pointer over any item, and it's identified at the bottom left of the screen. Need some creative help? A companion CD provides scenes, animations, and various extra textures, terrains, sky presets, and 3D objects.

Some quibbles: The manual will still befuddle beginners. Also, rendering Bryce movies in high resolution, uncompressed, can tie up your PC for hours. There's no type tool, or a way to link data to a 3D map. Finally, Bryce doesn't display actual measurements, as do most other 3D and CAD programs, so it's hard to tell the exact scale of things.

These flaws aside, Bryce 4's Web features and compelling 3D graphics are first-rate for business or personal use. Its creative potential is significant, provided you're willing to spend the time learning the exotic interface.

—John Goddard ▶

Bryce 4

PRO: Lets you easily create Web animation, photorealistic graphics.

CON: Unorthodox interface, lacks a text tool.

VALUE: Breathtaking 3D imagery for the Web.

Street price: $200, upgrade $99

MetaCreations

800/846-0111

www.metacreations.com

PRODUCT INFO. NO. 722

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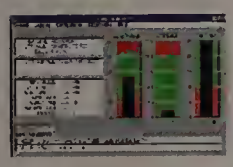

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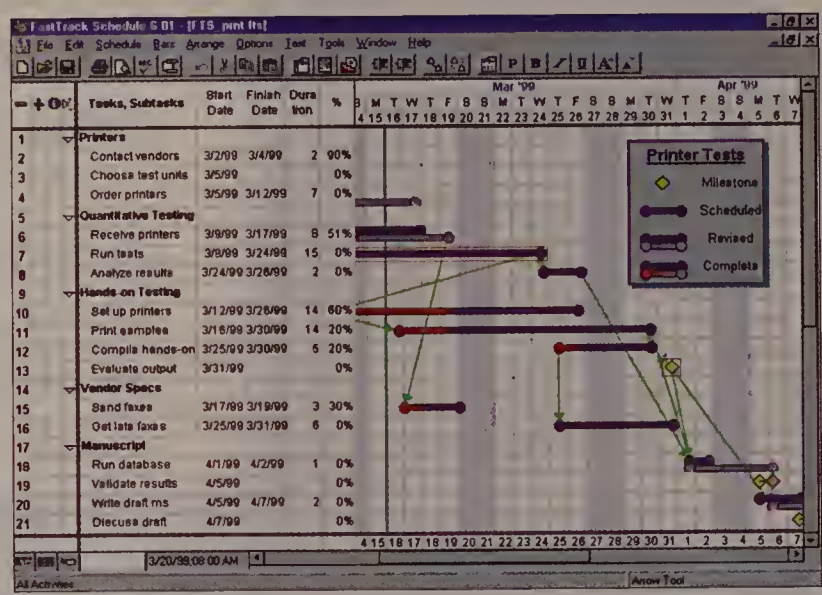
FastTrack Schedule: Easy Project Tracking

PROJECT MANAGEMENT

SOMETIMES, the hardest part of managing a complex project is breaking it down into small tasks that unfold in parallel. AEC Software's $199 **FastTrack Schedule 6.01** lets you visualize the parts of your project's schedule without having to spell out the relationships, an onerous requirement in more industrial-strength project-management packages. I tested a shipping copy.



FASTTRACK SCHEDULE'S main time line window shows percentage of each task completed in red and those behind schedule in light purple.

I entered my project's tasks, with duration and start or end dates, directly into rows on FastTrack's Gantt bar chart, with a time line for the *x*-axis—and FastTrack drew the bars for me. Then I linked a few task bars with dependency lines, signifying jobs that can't start until others are completed. As my project progressed and I entered completion dates for some tasks, the program highlighted bars for other work whose completion dates were slipping.

FastTrack also supplies a database-like window where each task appears as a record. You can define new fields, enter data in them, and perform calculations on your data—for example, to figure out rental expenditures over time and display them as a running total on your graph.

Reporting tools help inform others of a project's status, and you can generate reports that show different information, such as overviews for execs and detailed schedules for managers. You have to make format changes manually, but you can create FastTrack templates so that all your organization's charts speak the same visual dialect.

FastTrack can't identify idle or overloaded resources, as most project managers can. But for small projects involving a few people, FastTrack provides all the data you'll need to see where your plan hangs up—and how to fix it.

—Dan Littman

FastTrack Schedule 6.01

PRO: Very easy to use, excellent reporting tools.

CON: No style sheets.

VALUE: Features justify the cost.

List price: $199; upgrades $99 (from version 4 or 5) or $129

AEC Software

800/346-9413

www.aecsoft.com

PRODUCT INFO NO. 723

CompuServe 2000: Catching Up to the V.90s

ONLINE SERVICE

COMPUSERVE has always offered great content, but as an ISP, its speed and ease of access have been less satisfying—until now. **CompuServe 2000** is the service's most radical and promising step to improve access to its hundreds of research databases and forums and its extensive hardware and software support channel. Most users will want to upgrade, and even those who care less about content than a national provider with a good low-cost, limited-usage plan will want to check it out. One of CompuServe 2000's strengths is its use of AOL's network, which provides widespread V.90 56-kbps access (with Digital Subscriber Line service on the way). Users of previous CompuServe iterations often have to put up with 33.6- or 28.8-kbps access. CompuServe 2000 also adopted some of AOL's more-prized features such as five member names per account (4.0 offers only one) and e-mail enhancements such as color and font formatting, multiple attachment support, and automatic file-zipping and unzipping.

Travelers who want just access to e-mail and news from the road will welcome the $10-a-month plan, which includes 20 free hours (CompuServe 4.0 offers only 5 hours per month for the same price). Using my account during a trip to the East Coast, I found local numbers even in some rural areas. And because CompuServe 2000, like 4.0, uses few graphics or multimedia gewgaws, I flew from screen to screen, even with a 33.6-kbps modem. CompuServe users migrating to 2000 will get a new e-mail address using a shorter cs.com suffix, but the company says it will forward mail from users' old CompuServe addresses indefinitely. It's a good deal for devotees of the service, and the improved network as well as the competitive rate plans should encourage newcomers to check out the ever-useful content.

—Bryan Hastings ■

CompuServe 2000

PRO: Easy to install and use; fast; low-cost billing option.

CON: Not available for Windows NT computers.

VALUE: Well suited for people who log on for relatively short periods.

Pricing: $10 for 20 hours per month, $20 per month for unlimited access

CompuServe

800/369-5544

www.compuserve.com

PRODUCT INFO NO.724

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BY HARRY McCRACKEN AND GLENN McDONALD

REMEMBER FULL-SERVICE GAS STATIONS? Once upon a time, oil companies were so eager for your business that they'd fill up your tank, check your oil, wipe the windshield, and hand you a free set of attractive 8-ounce glasses on your way out.

Today's high-octane Web portals are like that. They'll give away virtually anything to get you to come back. Want a free e-mail account? (Take two, they're small.) How about some server space for your home page? They'll even manage your personal calendar for you, and toss in an online chat area for your virtual community.

But while these services may be free, your time—and bandwidth—isn't. Whether they're splattering ads all over their pages, pushing book and CD "recommendations," or just selling soap (and collecting pennies on each transaction), these sites have one goal in mind: to get you to put your money where your mouse is. ▶

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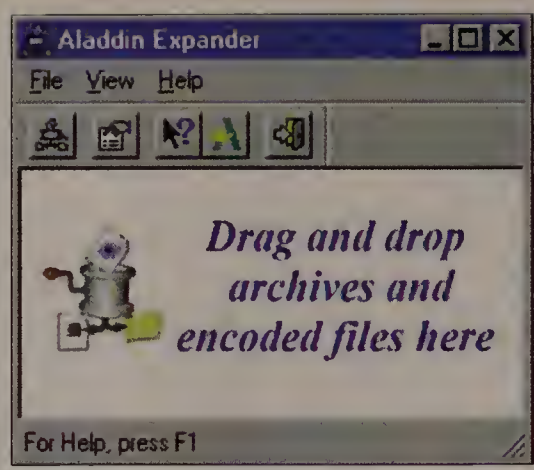
That's why we've reviewed the top e-mail, calendar, Web hosting, and community sites on the Net. Our picks are fast and efficient, feature-rich and advertising-poor—and in most cases, you won't find them on portal sites. We've also tracked down the best free Windows and Web utilities, and the best sites for tech support. We've even dug up a few URLs that help you put the company T1 line to work on your lunch hour—from movie sites to music players and medical advice—plus tips on how to stay sane while surfing. So pull on in and fill 'er up.

Windows Utilities

UNZIPPING THE **EASY** WAY

Aladdin Expander 5.0 Just about everything you download off the Net these days comes in a compressed format, so having a good unzipping utility is essential. Enter Aladdin Expander. This amazingly versatile piece of freeware handles all PC compression formats, various less common archived and encoded file types, plus the standard Macintosh compression format, StuffIt. Customization options? Expander can be configured to expand files with a double-click, right-click, or whenever a file is dragged onto the Expander desktop icon. It's so simple to use that you never have to think about it—and that's the best attribute a utility can have.
www.aladdinsys.com/expander/expander_win_login.html.



THE BIG SQUEEZE: Start your Net safari with Aladdin Expander, a simple, versatile utility for handling compressed files.

BONUS **WINDOWS** TWEAKS AND TRICKS

Power Toys A perennial favorite, Microsoft Power Toys is a 209KB collection of OS outtakes for Windows 95 that never made it into the shipping software. Lots of cool stuff here, especially the Tweak UI Control Panel, which lets you manually adjust things like mouse sensitivity. The Fast Folder feature lets you right-click a folder to get a cascading menu of contents, which can speed up file retrieval considerably. Desktop Menu puts an icon in your system tray, allowing you to access the desktop without the Minimize All Windows hassle. (Windows 98 comes with its own set of Power Toys, included on the installation CD-ROM.)
www.microsoft.com/windows95/downloads/contents/wutoys/w95pwrtoysset/default.asp?site=95

BASIC **Y2K** DEBUGGING

Norton 2000 BIOS Test and Fix From our Better-Safe-Than-Sorry Department, Symantec's Norton 2000 BIOS Test and Fix will diagnose and update your system's real-time clock and BIOS. Many apps rely on your PC for the date and time, so this is a critical area to cover. This free 1.3MB BIOS kit is one of several

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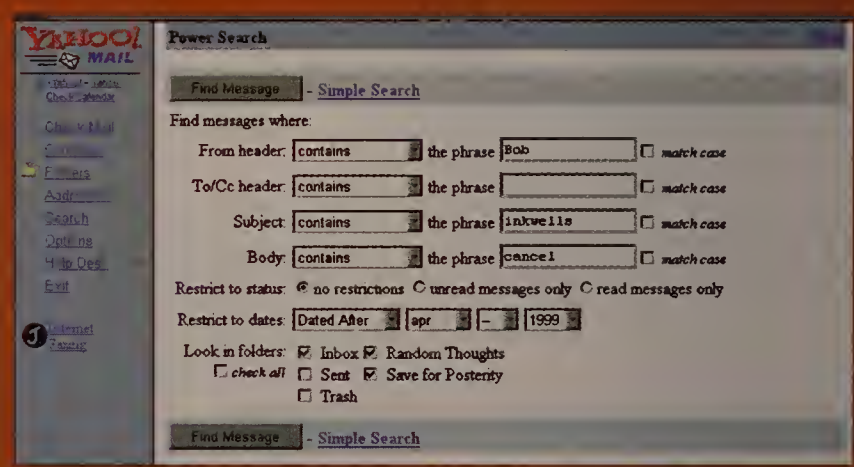
WE KNOW, WE KNOW: You already have an e-mail account. Or two, or three. Sign up for one of these free services anyway. They work from any Web browser and require no configuration, so you can instantly call on them when your primary e-mail account goes on the fritz (which it will). They're also a boon if you're traveling without a notebook: Mooch a few minutes on any Internet-connected PC, and you're in business. And they're invaluable for correspondence you'd just as soon keep out of your corporate account—job-hunting inquiries, the flood of messages from your Steely Dan mailing list, and so forth.

These days, it seems like every Web site from aardvark.org to zootsuit.net touts free e-mail. Truth to tell, most are powered by a handful of behind-the-scenes services. For instance, Netscape Netcenter's WebMail is USA.Net's Net@ddress in disguise; PC World Online's MyWorldMail is a variant of Lycos's MailCity. If your favorite site offers an e-mail service, try it before shopping elsewhere; most are decent, and it's convenient to park your in-box at a spot you already frequent.



SO MANY MESSAGES, so little time to keep track of them: Yahoo Mail's sophisticated search tools help you find any message fast.

But if you want the best overall service, surf over to Yahoo Mail (mail.yahoo.com) or Hotmail (www.hotmail.com). Fast but not flashy, Yahoo Mail is just what you'd expect from the ever-practical folks at Yahoo. You get 3MB of space to store e-mail, plus all the essentials: support for file attachments, the ability to retrieve messages from any POP3 mail server, and in-box-taming tools such as filters and searchable folders. Yahoo Mail also delivers bonuses few competitors match—for instance, if you run the free Yahoo Pager instant-messag-

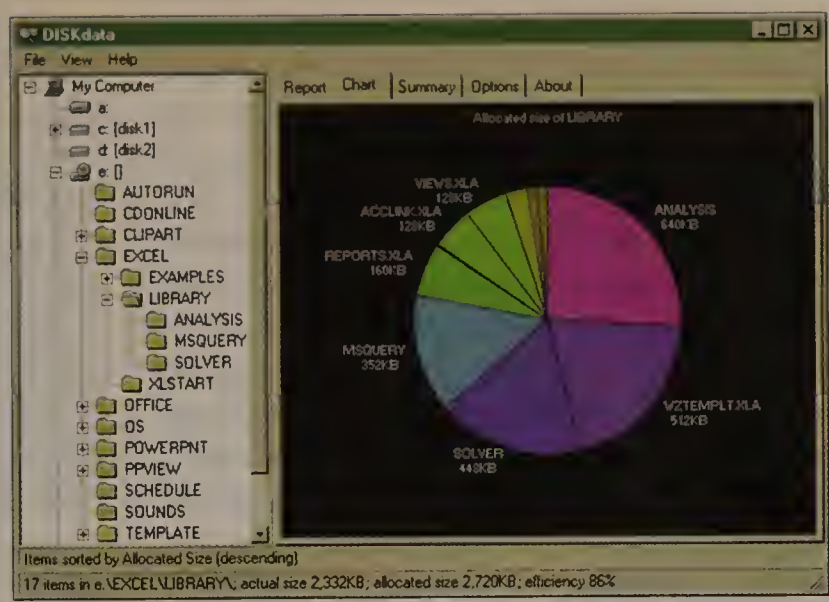
components in Symantec's retail $50 Norton 2000 package.
www.symantec.com/sabu/n2000r/index.html

WATCH THAT MEMORY

Mem Viewer Ever wonder which apps hog the most memory? Mem Viewer will tell you via a small bar graph window, which you can position anywhere on the desktop. This analysis utility can be handy for determining whether you should add more RAM to your PC. If you find that your most commonly used programs tend to max out memory capacity, consider upgrading. The recent 2.0 release lets you set a miniviewer in the system tray, keeping it out of the way of active windows.
gene6.idegrif.com/index.html

LORD OF THE FILES

Diskdata Think of it this way: You're the landlord of your PC's hard drive. Over the last couple of years, all sorts of tenants have moved in, thrown parties, remodeled, and let various deadbeat relatives live in the basement. Diskdata helps you figure out which tenants need to be evicted, or at least moved to another partition, by showing you exactly how much space each folder or subfolder is taking up, even among separate external drives or large partitioned ones. You can display statistics in report, bar, or pie chart format. The utility comes with nice help files, too.
www.digallery.com/diskdata



ANALYZE DISK: Hard drive utility Diskdata makes it easy to see how much space your files consume—and which ones you should whack.

FRESH PRINTS

PrintKey Really now. Printing something you can see *right there* on your monitor should be simple—a piece of cake. But if you've ever tried to print out a single element from a busy Web page or graphics file, you know what a pain it can be. PrintKey uses the old DOS-era Print Screen button to—imagine!—do just that, and more. With PrintKey you can print the whole screen, an active window, or just about any piece of desktop real estate you can outline in a rectangle with your mouse. You also get image editing tools so you can adjust contrast, orientation, and picture size before printing—all in a 281KB download. PrintKey supports BMP, EMF, GIF, JPEG, and WMF formats.
www.geocities.com/SiliconValley/Bay/3053

DIGITAL PAPER SHREDDING

BCWipe Deleted files, even those emptied from the Recycle Bin, can remain on your hard drive and be recovered. BCWipe, a no-nonsense electronic "paper shredder," ensures that deleted files are well and truly gone. Once installed, BCWipe, which complies with U.S. Department of Defense recommendations, gives you extra options when right-clicking to delete a file. 'Delete with Wiping' dumps your file, then wipes that area of the ▶

ing applet, you can check for new messages without firing up your browser. Outlook and PalmPilot users can synchronize those products with Yahoo Mail's address book. And the service's smooth interface and low ad count let it run as briskly as any free e-mail service we've tried.

Microsoft's Hotmail is equally pleasing for some of the same reasons. The service has had some outages recently, but that's a hazard you risk with any free service—one we encountered with several of those here. Though it lacks instant messaging and you can't sync it with your address book, it's got a well-rounded feature set and a quick user interface. Hotmail can also scan file attachments for viruses before you download them—no antivirus software required on your end. You can also access Hotmail from Internet Explorer 5.0's Outlook Express e-mail client (this part of the service was in beta at press time), letting you work offline, save messages to your hard disk, and use Outlook Express to manage your mail. However, some users may find the 2MB of storage space a bit meager (most competitors provide 3MB or more); messages will bounce back to senders once the 2MB is consumed.

Among the other contenders, Net@ddress (www.netaddress.com) stands out for its range of features. It provides HTML templates to dress up your messages, exchanges address-book info with virtually any other app, and lets you create multiple signature files (say, one for business and one for personal notes). But this powerful service felt a tad slower than the snappy Yahoo Mail and Hotmail—probably due to its more elaborate user interface and heavier ad content. When you're itching to check your in-box, watching an animated casino ad slowly load is no fun.

Hotmail and Yahoo: First-Class E-Mail

SERVICE	What's hot	What's not	Bottom line
Excite Mail (mail.excite.com)	Not much.	Can't filter or search mail; ugly color scheme and lots of ads.	For Excite addicts only.
Go Network Mail (mail.go.com)	Fine tools for filtering and searching mail.	Won't check your POP3 mailbox; underpowered address book.	Not enough there there.
BEST Hotmail (www.hotmail.com)	Fast and customizable; scans attachments for viruses.	Skimpy 2MB of storage space; can't sync with address book.	Fast and feature-rich.
MailCity (www.mailcity.com)	4MB of space; antispam tools; autoforwards mail ($13/year).	No filter feature; can't search folders.	Middle of the pack.
Net@ddress (www.netaddress.com)	5MB of space; HTML templates; imports, exports address books.	Heavy advertising content; slower than most in our tests.	Love the features, hate the advertisements.
ProntoMail (www.prontomail.com)	4MB of space; slick integration with ICQ and pagers.	Too many ads and shopping links; few filters; no folder searching.	More e-commerce than free commerce.
BEST Yahoo Mail (mail.yahoo.com)	Quick, easy; works with Yahoo Pager, Outlook, PalmPilots.	Can't handle multiple signature files.	At least as cool as Hotmail.

hard drive to make sure no data remains. Just make sure you really want to delete a file before you do it, because once BC-Wipe gets hold of a file, it's gone for good.
www.jetico.sci.fi

Web Utilities

SEEK AND FIND OTHERS ONLINE

ICQ ICQ is the wildly popular instant-messaging system that enables real-time communication with other users on the Net. Much like AOL's instant-messaging system, ICQ lets you chat and exchange URLs or images with other registered users at any time. This model has a ton of advanced new features, including multi-user chats, real-time gaming, and support for Internet telephony. What's more, it's free for anyone to download and remains simple to use despite its growing popularity and feature set. You can choose to work in Advanced or Simple mode, a nice option for new users.
www.icq.com

SIMPLE FAX

EFax.com A good idea whose time has come, EFax.com provides fax forwarding via e-mail. Register online, and you'll be issued a fax number that you can provide to anyone wishing to send you a fax. EFax.com reformats all incoming faxes as e-mail attachments, which you can read via the free downloadable (and self-installing) fax viewer. It's perfect for those of us trying to run a truly paperless office. How does EFax.com make money? The company plans to offer future premium services for a fee, including the option to send outgoing faxes via e-mail; and incoming faxes come with splash-screen ads.
www.efax.com

NO MORE TIME-OUTS

Keep It Alive Few things in life are as annoying as being kicked off your Internet connection due to your ISP's time-out setting. (Well, getting stuck behind a slow driver in the fast lane is as annoying, but that's about it.) If your ISP has such a setting, then the tiny (400KB) freeware app Keep It Alive is your new best friend. It will "ping" your connection every few minutes, fooling your ISP into thinking you're hard at work online. The new 2.0 version is fully compatible with all online services—good news for frustrated AOL users.
www.geocities.com/SiliconValley/Garage/7334/Kpalive.html

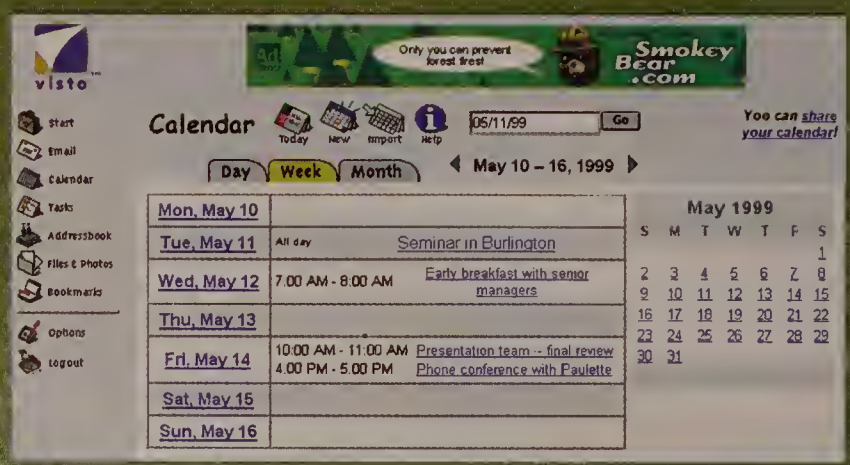
WEB ACCELERATION THAT WORKS

NetSonic Web 3000's NetSonic is everything that Web acceleration ought to be. When your modem is idle (while you are reading an already-loaded page, for example), NetSonic prefetches the Web pages that you're likely to visit. (It keeps track of the sites that you visit most frequently.) Then it grabs only the new elements from a page. The result: faster surfing. You can set limits on the cache to keep your hard drive from being eaten alive. A retail version is available, but the freeware version of NetSonic covers all the basics.
www.web3000.com

MARK YOUR CALENDARS WEB-BASED SCHEDULERS

BEST Visto Briefcase

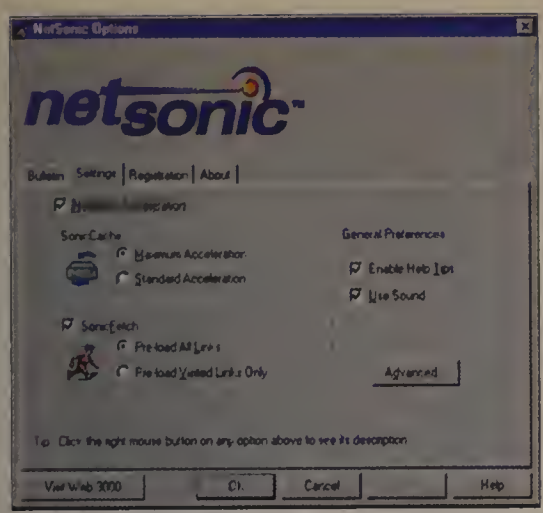
FREE WEB-BASED CALENDAR services are sprouting up like Starbucks shops. No wonder. Keep your calendar on the Internet, and you can manage it from any PC with a browser and share it with coworkers, friends, and family. And Web calendar services can do things desktop personal information managers can't—like meld your personal schedule with information on the weather in Wisconsin, with the plot line of the next episode of *Sports Night*, or with your daily horoscope.



WEEK LINKS: Online calendars like Visto Briefcase let you manage your schedule from any browser and exchange data with popular PIMs.

But don't dump your desktop PIM just yet. If you use a modem to go online, you'd have to dial up and connect to the Net just to check your schedule. And let's face it: Downtime Happens, even if you've got a persistent Internet connection at work or at home. The prospect of the Web flaking out for an hour or two just when you need to check your schedule is unnerving.

Most of these services are piling on new features at a blistering pace, and a couple of extremely promising contenders, AnyDay.com (www.anyday.com) and Jump (www.jump.com), were still in beta at press time. Of those that were fully up and running, Visto Briefcase (www.briefcase.com) is the standout. More than most, Briefcase is a true Web-based PIM, with a calendar and to-do list; address book; e-mail; and repositories for files, digital photos, and browser bookmarks. It lets you put your calendar, photos, and files on a Web page that can be viewed by other netizens. You can even restrict access with a password. Briefcase also offers the most possibilities for exchanging data with desktop PCs. Its free Windows utility transfers data between Briefcase and Outlook, Lotus Organizer, and other applications; syn-



TIRED OF WAITING for Web pages to load? Web 3000's NetSonic speeds your surfing by fetching pages while your modem is idle.

USEFUL **VARMINTS** ON THE NET

WebFerret WebFerret is the alpha ferret of a little family of critters that include FileFerret, PhoneFerret, EmailFerret, and NewsFerret. Ferretsoft, maker of this very cool line of Web search utilities, offers freeware versions of each of its retail offerings. WebFerret works like a slimmed-down multiple-search engine, running a single query through several search services, discarding duplicate links, and generating surprisingly fast returns. The Ferrets' chief advantages are their agility, their compact size (WebFerret takes up just 848KB), and their extreme ease of use. This freeware pays for itself with small banner ads, which you can disable in the retail Pro version. Highly recommended.
www.ferretsoft.com/netferret/download.htm

THE **SURF** REPORT

Alexa Alexa is a small toolbar that attaches to the bottom of your Internet Explorer browser window and tells you the size of the site you're currently browsing, how often it updates, and how fast its servers are. The new 3.0 version can shuttle you directly to online references like Encyclopaedia Britannica Online and Merriam-Webster's Dictionary and Thesaurus. A related-links option points you to similar sites, giving you a list of, say, online stock-trading sites. Advertisers can pay to be listed in the related links for any given site, so caveat webtor. Older versions supporting Navigator are also available, but version 3.0 works only with IE for now.
www.alexa.com/download/index.html

ALL-IN-ONE **SEARCH** SUITE

Copernic 99 Like WebFerret, Copernic acts as a multiple-search tool that can target more than 30 separate online information sources—such as search engines, newsgroups, and e-mail directories—under one interface. You can save and export search results in various file formats (HTML, XML, text, and DBF) for easy e-mailing with friends or colleagues. The freeware version limits searches to Web sites, newsgroups, and e-mail directories. For access to the 20-odd additional "channels" (Business, Finance, Games, News, Sports, and so on), you have to purchase the $30 Pro version.
www.copernic.com/product99.html

PUTTING THE **'MULTI'** IN MULTIMEDIA

RealPlayer G2 RealAudio, RealVideo, RealText, RealFlash. Real cool. RealNetworks has been in the business of online multimedia for years, and the company continues to release new tools designed for both the multimedia developer and the consumer. RealPlayer G2, the latest incarnation of the company's freeware user client, can handle just about any kind of multimedia the Internet can chuck in your direction. You can adjust bass and treble for audio files and view video clips directly, whether they're locally cached ▶

chronizes its e-mail in-box with a desktop mail client; and can even route files automatically between Briefcase and your desktop PC.

But Briefcase also has its share of nicks and scuffs. Unlike most desktop PIMs, it offers no way to search your calendar, and its e-mail doesn't rival the best stand-alone Web e-mail services (for example, you can't send blind carbon copies of messages). Briefcase also does not keep you au courant on what's new in the outside world. For that, you'll need a service such as Day-Timer Digital (digital.daytimer.com) or When.com (www.when.com), which let your calendar include reminders about activities such as movie openings, sporting events, and local happenings. Tell When.com you're an *All in the Family* fan, and it will track reruns, complete with plot descriptions, and put them on your calendar. Why are these calendars so generous with information? Eventually they plan to take a cut of proceeds from the sale of books, movies, or other items purchased at their sites.

Ultimately, we recommend using a Web-based calendar as a complement to your desktop PIM, not as a replacement. Many of these services can automatically synchronize with popular PIMs and with 3Com's Palm organizers. That capability gives you the best of both worlds: the ability to manage your schedule with a desktop package at the office, then switch to the Web when you're at home or on the road, or need to share appointments with others.

Visto Briefcase Leads the Web **Calendar** Race—for Now

SERVICE	What's hot	What's not	Bottom line
AnyDay.com (www.anyday.com)	Highly customizable calendar and to-do list; nice interface.	Beta version can't sync with PIMs or track current events.	Tune in tomorrow.
Day-Timer Digital (digital.daytimer.com)	Tracks current events; provides to-do list and multiple views.	Hard to navigate; can't share calendar; no address book.	When.com has the edge as an event guide.
Jump (www.jump.com)	Slickly integrates calendar, address book, and e-mail.	Beta version is a bit slow and has a few usability quirks.	Another extremely promising beta product.
MagicalDesk (www.magicaldesk.com)	Offers e-mail, to-do list, and file sharing, all without ads.	No calendar sync (yet); no weekly view or current events.	Visto Briefcase Jr.
PlanetAll (www.planetall.com)	Ingenious networking features; syncs with Outlook and PDAs.	Lacks to-do list; won't share most calendar data with others.	Sterling address book, so-so calendar.
BEST Visto Briefcase (www.briefcase.com)	Strong to-do list, good e-mail and tools for sharing data.	Can't search calendar; doesn't follow current events.	The closest thing to a full-blown PIM on the Web.
When.com (www.when.com)	Tracks movies, book releases, and lots more; very easy to use.	No to-do list; can't share personal calendar.	Social butterfly, but not for business.
Yahoo Calendar (calendar.yahoo.com)	Multiple schedule views; syncs with Outlook and PalmPilots.	Spartan look; no event tracking; limited calendar sharing.	If you love Yahoo, you'll like this calendar.

on your hard drive or as streaming video (assembled on the fly from the Internet). RealNetworks boasts a 100 percent improvement in both audio and video over the previous RealPlayer 5.0. You can now specify your own set of RealChannels to receive continually updated programming from the likes of the Rolling Stone Network, CNN, ESPN, and NPR.
www.real.com/products/player

MP3 FOR THE MASSES

Maplay 1.2+ Plenty of MP3 players exist; pure versatility is what makes this one so popular. MP3 is the controversial media format that lets users quickly and easily create, post, and download audio files, regardless of whether the audio is licensed. A full 32-bit application, Maplay has built-in support for MP3 but can also tackle almost any multimedia format your system supports—WAV, MIDI, Sun AU, Apple QuickTime, Video for Windows, Video CD, MPEG video, CD audio, and so on. A built-in playlist editor lets you create, edit, and save playlists of downloaded files, and you can associate images or text with each track, making your own virtual packaging.
www-inst.eecs.berkeley.edu/~ctsay/mp2win32.html

NOT YOUR FATHER'S CHAT ROOM

Microsoft Chat and V-Chat Unlike strictly text-based chat systems, Microsoft Chat and V-Chat create continually running panel cartoons in which each user is a character of his or her choosing, endlessly bantering away in The Strip That Never Ends. You can choose from a variety of icons, body types, and facial expressions. Feeling hip? Be a beatnik. Feel- ▶

WEB SPACE 1999
FREE HOMES FOR YOUR SITE

BEST Homestead

THE GREAT INTERNET LAND BOOM is still, well, booming. Any number of free Web hosting services will now give you anywhere from 11MB to 25MB for a Web site that you can use to broadcast a hobby, show off family photos, or promote your organization or small business. But even 11MB is a sprawling parcel of Web real estate. What really differentiates these services is the quality of their site-building tools and the degree to which they plaster your site with ads.

That's why **Homestead** (www.homestead.com) is our hands-down favorite. Aside from a discreet promo for itself, this service doesn't clutter your 11MB of Web space with ads, and its Java-based tools' smart blend of simplicity and power is unmatched. Want to place animated clip art, a counter, a guest book, a search engine, or even a chat room on your site? Simply drag it off the toolbar and plop it anywhere on your page. (Some of these elements are provided by Web sites such as HotBot, DejaNews, and Rolling Stone Online; Homestead's financial agreements with them are what keep your Webspace free.) Other Homestead virtues include custom URLs that are easy to remember (such as www.homestead.com/*yournamehere*) and basic security via password protection. Our only real gripes are two ugly facts of life with Java applications: The site-building tools take a while to load and crash occasionally.

BROWSER FOR BOWSER: Whether you run a pet shop or just want to air your pet peeves, Homestead gives you a place—and space—on the Web.

Homestead can import HTML files created elsewhere, but if you're a confirmed HTML tweaker, you may prefer **GeoCities** (www.geocities.com) or **Tripod** (www.tripod.com). Both of these free-Webspace pioneers offer 11MB of space, an online HTML editor for editing code manually, and extensive site-construction tools for beginners, experts, and everyone in between. However, they also festoon your pages with ads; Tripod's mandatory pop-up promos are particularly aggravating.

Remember, though: These Web hosting sites change more often than the weather. Today's ad-free Web hosts may be littered with banners tomorrow. If you are adamantly antiadvertising, then a free Web host may not be for you.

There's No Place Like **Homestead**

SERVICE	What's hot	What's not	Bottom line
FortuneCity (www.fortunecity.com)	20MB of Web space; relatively unobtrusive ads.	Spartan site-building tools; cryptic URLs.	Lost in space.
GeoCities (www.geocities.com)	Excellent tools for everyone from newbies to HTML pros.	Puts ads and the GeoCities logo on your site; cumbersome URLs.	Lots to offer—and lots of ads.
Theglobe.com (www.theglobe.com)	12MB of Web space is a meg more than most provide.	Crude site-building features; truly irritating pop-up ads.	Better bet: Homestead, GeoCities, or Tripod.
BEST Homestead (www.homestead.com)	Simple, powerful, and no ads; easy URLs; password protected.	Fewer tools than some others for tweaking HTML by hand.	Easy-to-use, potent, fun—our favorite by far.
Tripod (www.tripod.com)	Tons of tools and tutorials for novices and experts alike.	Irksome ads; requires you to update your site monthly.	Not bad, but not Homestead either.
Xoom.com (www.xoom.com)	Plenty of Webspace; nice chat room feature.	Places a strip of ads on all your pages; so-so site-building tools.	Once ad-free site is now one of most commercial.

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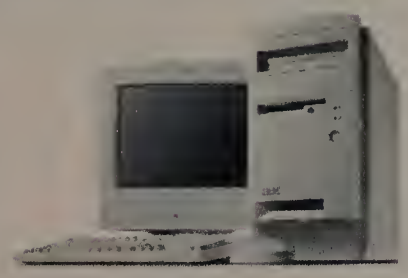
You can find information, tools and updates at www.ibm.com/pc/year2000 Check out the Road Map to Readiness, IBM Product Readiness Database, the hardware evaluation tool, device drivers, BIOS updates and instructions to reset the date manually. Many updates are available to help you prepare for Year 2000. However, if you decide to buy a new personal computer for any reason, IBM has a range of award-winning products for you to consider.



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*Estimated reseller price to end users. Actual prices may vary. Prices do not include monitors. Prices are for the following models: Netfinity 847631U, PC 300 6287-32U, IntelliStation 6893-62U, ThinkPad 390-90U. [1]A product is Year 2000 "Ready" if the product, when used in accordance with the associated documentation, is capable of correctly processing, providing and/or receiving date data within and between the 20th and 21st centuries, provided all other products (for example, software, hardware and firmware) used with the product properly exchange data with it. "Ready" refers to the IBM hardware only, not to any software. IBM cannot take responsibility for the readiness of non-IBM software and other products, even if they are preinstalled or otherwise provided by IBM. You should contact these third parties directly to verify readiness, understand limitations, and/or look for updates to their products. If your computer is on at the beginning of the Year 2000, you should turn it off and then back on again once, or restart the operating system, to ensure the internal clock resets itself for the new century. To learn more about IBM PC products and the Year 2000, visit our Web site at *www.ibm.com/pc/year2000* or call 1 800 426-3395 and request fax document #10020. [2]MHz measures only microprocessor internal clock speed, not application performance. Many factors affect application performance. [3]GB means one billion bytes when referring to hard drive capacity; accessible capacity may vary. [4]Variable read rate. Actual playback speed will vary and is often less than the maximum possible. [5]Fire GL1 is a trademark of Diamond Multimedia Systems, used under license. [6]For terms and conditions, visit *www.ibm.com/pc/us/y_ibm* IBM and IBM product names are trademarks of International Business Machines Corporation. Intel, Intel Inside and Pentium are registered trademarks of Intel Corporation. ©1999 IBM Corp. All rights reserved.

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TheWorkz - $850
400 AMD K6-2 Processor
1024K L2 Cache
64MB PC100 RAM
8.4GB Hard Drive
40x CD-ROM
1.44MB Floppy Drive
15" .28 Color Monitor
8MB 64-bit AGP Video
16-bit 3D Full Duplex Sound with Twin Amplified Speakers
K56 v.90 Voice/Fax/Data Modem
2 Serial - 1 Parallel Port
2 USB - 1 Game Port
Microsoft® Windows® 98 w/ CD
3-year on-site warranty and 24 hour tech assistance
Windows Multimedia Keyboard
3-button WorkzMouse
PC-Cillin Virus Protection Software

GameWorkz - $1275
450 AMD K6-2 Processor
1024K L2 Cache
128MB PC100 RAM
10GB Hard Drive
40x CD-ROM
1.44MB Floppy Drive
15" .28 Color Monitor
16MB Riva TNT Video Card
16-bit 3D Full Duplex Sound with Twin Amplified Speakers
K56 v.90 Voice/Fax/Data Modem
2 Serial - 1 Parallel Port
2 USB - 1 Game Port
Microsoft® Windows® 98 w/ CD
3-year on-site warranty and 24 hour tech assistance
Windows Multimedia Keyboard
3-button WorkzMouse
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16-bit 3D Full Duplex Sound with Twin Amplified Speakers
K56 v.90 Voice/Data/Fax Modem
2 Serial - 1 Parallel Port
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Microsoft® Windows® 98 w/ CD
3-year on-site warranty and 24 hour tech assistance
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3-button WorkzMouse

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500 Intel Pentium III Processor
512K L2 Cache
64MB PC100 RAM
13GB Hard Drive
40x CD-ROM
1.44MB Floppy Drive
17" .28 Color Monitor
8MB 64-bit AGP Video
16-bit 3D Full Duplex Sound with Twin Amplified Speakers
K56 v.90 Voice/Fax/Data Modem
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Circle 169 on card or go to www.pcworld.com/productinfo

ROCK AND REAL: RealNetworks' RealPlayer G2 can turn your PC into MTV—but without the commercials.

ing mean? Be a monster. Or just show up with a bag over your head. (Really.) The newer V-Chat system is even more ambitious, adding 3D images and ambient sound to the environment, using DirectX technologies such as DirectDraw and Direct3D. Chat takes up 1.7MB, while V-Chat occupies 3.5MB.
www.microsoft.com/windows/ie/chat

Tech Support

ONE-STOP SHOPPING FOR **WINDOWS** INFO

ActiveWindows This well-designed site houses a galaxy of useful technical information about—but not limited to—Windows. You'll find articles, tips, FAQs, bug alerts, downloads, and reviews collected from around the Web. ActiveWindows contributors generate much of the content, but many items are reproduced from—or simply link to—other computing sites. The interface is a marvel of organization. For quick reference help and troubleshooting, check out the FAQs section, with categories for DirectX, Internet Explorer, Windows 98, and more.
www.activewin.com

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SupportHelp.com SupportHelp.com features a searchable database of tech support resources you can sort by keyword, company, or product. While it provides little original content, it excels at getting you data about individual hardware and software manufacturers. But the real prize here is the direct links to dozens of online forums and newsgroups via Delphi Forums, where you can post specific questions about whatever is giving you trouble.
www.supporthelp.com

THE ULTIMATE IN TECH SUPPORT **FAQs**

The PC Guide This sprawling Web site evolved from one man's attempt to create a listing of FAQs for the alt.comp.hardware.pc-homebuilt newsgroup. Now a monster site comprising more than 1700 pages, The PC Guide is dedicated to providing technical assistance for everyone "from the total newbie to the accomplished expert." You'll find detailed reference guides to every component of the PC, and walk-through areas for basic system maintenance and upkeep.
www.pcguide.com

SHARE THE **KNOWLEDGE**

Indiana University Knowledge Base The Indiana University Knowledge Base is a gumbo of Perl scripts, HTML files and databases, as well as several thousand text entries assembled by the staffers at the University Information Technology Services' Support Center at Indiana University. But don't worry—it all works like a charm. This is a work in progress, in the best sense of the term, and you'll find more than 5000 question-and-answer files here. The result is a surprisingly friendly, comprehensive system that leaves you feeling as if you're actually dealing with a knowledgeable tech support staffer.
kb.indiana.edu

A **MECHANIC** YOU CAN TRUST

PC Mechanic Here's where to find everything you wanted to know about your computer but were too afraid to ask. Well-organized and comprehensive, PC Mechanic concentrates on hardware and features a dozen or so basic guides for the various areas of your PC: processor, hard drive, memory, monitor, and so forth. Each area contains step-by-step how-to articles for upgrade and repair, as well as external links to other resources online. The site offers a $10 downloadable edition that will generate a printer-friendly file of all internal content.
www.pcmech.com ▶

WILL YOUR NEXT PC **BE FREE?**

You already can get free e-mail accounts, server space, and all the gratis software you can stuff on a hard disk. Now several Web entrepreneurs are clamoring to give you a system for nearly nothing—but even a "free" PC will end up costing you something. Sign up at Free-PC (www.free-pc.com), and you may be eligible to receive one of 10,000 Compaq Presarios (or other brand-name systems) at absolutely no cost. The catch? You must be willing to give up a raft of personal information (about household income, hobbies, magazine subscriptions, and so forth) and agree to view advertisements whenever the machine is turned on. Taking a slightly different tack, NuAuction (www.nuauction.com) plans to give away 12,000 PCs to randomly selected users who register with the person-to-person auction site. The first lucky winners will be announced in June. Meanwhile, DirectWeb (www.directweb.com) plans to pass out 25,000 machines (Celeron 333s or better) to users willing to spend $20 to $50 a month for DirectWeb's Internet access service. If you want to ditch the service later, however, you'll have to send the computer back. But what do you expect for nothing?

FREE FOR ALL? If you're willing to give up your personal info to a Web site—and your eyeballs to ads—you could win a free PC.

SONY

To: Suzanne
From: The Rickster
Subject: All 4 U!

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PROSIGNIA NOTEBOOK 162	PROSIGNIA NOTEBOOK 161	PROSIGNIA NOTEBOOK 124
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6.4 GB SMART Hard Drive	4.0 GB SMART Hard Drive[1]	4.0 GB SMART Hard Drive[1]
64 MB SDRAM (expandable to 192 MB)	64 MB SDRAM (expandable to 192 MB)	64 MB SDRAM (expandable to 192 MB)
14.1" CTFT (1024 x 768) Display	14.1" CTFT (1024 x 768) Display	12.1" CTFT (800 x 600) Display
24X Max CD-ROM[2]	24X Max CD-ROM[2]	24X Max CD-ROM[2]
Compaq V.90 Data/Fax Modem[6]	Compaq V.90 Data/Fax Modem[6]	Compaq V.90 Data/Fax Modem[6]
Compaq PremierSound™	Compaq PremierSound	Compaq PremierSound
Integrated AC Adapter; 2 Li-Ion Batteries	Integrated AC Adapter; 1 Li-Ion Battery	Integrated AC Adapter; 1 Li-Ion Battery
Microsoft® Windows® 98	Microsoft Windows 98	Microsoft Windows 98
Microsoft® Office 97 Small Business Edition®	Microsoft Office 97 Small Business Edition	Microsoft Office 97 Small Business Edition
Free[4] Trial of Compaq Online Services	Free[4] Trial of Compaq Online Services	Free[4] Trial of Compaq Online Services
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March 1999
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Prosignia Desktop 330

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PC World Magazine
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PROSIGNIA DESKTOP 330	PROSIGNIA DESKTOP 330	PROSIGNIA DESKTOP 320	PROSIGNIA SERVER 740
Intel Pentium III Processor 500/100 MHz	**Intel Pentium III Processor 450/100 MHz**	Intel® Celeron™ Processor 433/66 MHz	Intel Pentium II Processor 400 MHz
18 GB Ultra ATA Hard Drive[1]	13.5 GB Ultra ATA Hard Drive[1]	9.1 GB Ultra ATA Hard Drive[1]	512 KB L2 Cache
128 MB SDRAM (expandable to 384 MB)	128 MB SDRAM (expandable to 384 MB)	64 MB SDRAM (expandable to 256 MB)	Dual Processor Capable
Compaq S900 19" Monitor (18" viewable)	Compaq S700 17" Monitor (15.7" viewable)	Compaq S700 17" Monitor (15.7" viewable)	64 MB SDRAM (expandable to 1 GB)[7]
6X/32X DVD-ROM Drive	40X Max CD-ROM[2]/Iomega® Zip Drive 100 MB	32 Max CD-ROM[2]	9.1 GB SCSI Hard Drive[1]
Compaq 56K V.90 PCI Modem[6]	Compaq 10/100 Network Controller	Compaq 56K V.90 PCI Modem[6]	Max Internal Storage of 54.6 GB[7]
Altec Lansing ACS44 speakers w/subwoofer	Creative Labs 2-Piece Speakers	Creative Labs 2-Piece Speakers	8 Bays: 4 Removable, 4 Hard Drive
STB/nVIDIA TNT, 3D AGP 16 MB	STB/nVIDIA TNTv, 3D AGP 16 MB	STB/nVIDIA TNTv, 3D AGP 16 MB	32X Max CD-ROM[2]
Microsoft Windows 98	Microsoft Windows 98	Microsoft Windows 98	10/100 TX UTP NIC
Microsoft Office 97 Small Business Edition	Microsoft Office 97 Small Business Edition	Microsoft Office 97 Small Business Edition	Server Management Software
Free[4] Trial of Compaq Online Services	Free[4] Trial of Compaq Online Services	Free[4] Trial of Compaq Online Services	Pre-Failure Warranty:[8] Memory, Drives, Processors
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Upgrade to Microsoft Office Professional: $199	Upgrade to Microsoft Office Professional: $199	Upgrade to Altec Lansing ACS44 speakers: $43	Add 9.1 GB Hard Drive: $599
Upgrade to Windows NT®: $99	Upgrade to Windows NT: $99	Add Iomega Zip Drive: $79	Preloaded Microsoft Windows NT and Novell® NetWare operating systems available

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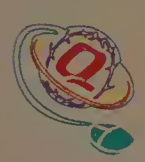

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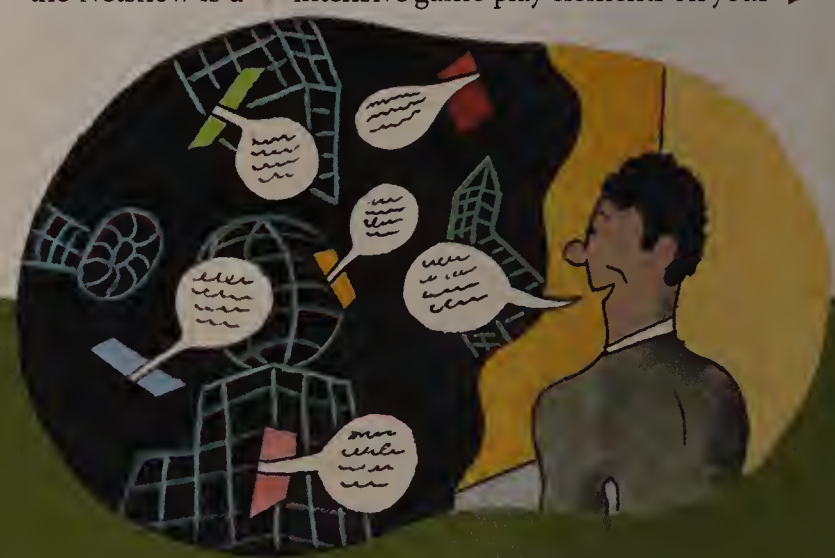
Spinner.com This popular Internet broadcasting service gives you a constant stream of music, all day every day, just like traditional radio—only without commercials, DJs, or Emergency Broadcast System breaks. Windows users can download the free Spinner player and tune into any of more than 100 channels—from rock to classical to movie scores. Spinner uses its own streaming audio technology to deliver the goods through your PC's speakers (or headphones, for covert office jamming), and sound quality is excellent. Warning: Highly addictive.
www.spinner.com

NAME THAT **URL**

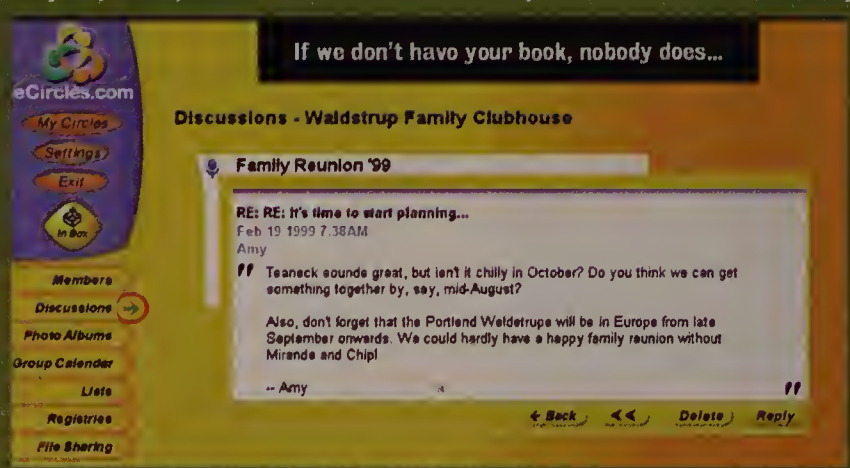
You Don't Know Jack–the Netshow You Don't Know Jack—the Netshow is a free online version of the pop-culture quiz show CD-ROM that was all the rage a few years back. This is as close to the feel of an actual interactive television broadcast as you can get, even with a dial-up connection, thanks to the creative production and some ingenious programming. To play, you need to download a game installer (this takes about 10 minutes over a 56-kbps connection), which puts all the graphics-intensive game-play elements on your ▶



OUR GANG ONLINE COMMUNITY SITES

BEST ECircles

WHEREAS WEB SITE HOSTS like Homestead and its rivals give you the equivalent of an empty lot and a box of site-building tools, the services in this category provide a prefabricated, private online home for your club, friends and family, or other group. The possibilities are limitless–you could put your local PTA on the Internet, start an online book club, or establish an ongoing virtual reunion for your far-flung relations. Simply sign up, fill out a form, and you're instantly in business, with amenities such as message boards, a chat room, a shared calendar, and a digital photo album. These online community sites are designed primarily for home users; you can also use them for business communications, but they don't guarantee constant availability or airtight security. (Your meeting place is protected by simple passwords, not by encryption or other heavy-duty safety measures.)



COMMUNITY PROPERTY: Would you rather type than talk? Sites like ECircles let you commune via modem with other like-minded souls.

None of the services here offers every feature you might want, and all are still evolving. (For example, ECircles and EGroups didn't offer chat rooms when we tried them. Both plan to have those features in place by the time you read this.) Since all of these community sites are free, you should try several before settling in permanently. We'd start the hunt at ECircles (www.ecircles.com), our overall favorite. You can create a "circle" in a jiffy and issue e-mail invitations to others to join you there; circles provide threaded message boards, a group calendar, areas where you can share photos and files, and (on the commercial side) a gift registry that lets you purchase items from EToys, CDNow, and other online merchants. Each member of your circle can choose to receive daily or weekly e-mail digests of new messages, discussions, and other activity. We like the friendly user interface, too, although some folks might find the orange-and-purple color scheme a little hard on the eyes.

Also worthy of note is EGroups (www.egroups.com), which gives a new twist to one of the oldest forms of Internet collaboration–the humble mailing list. No relation to the similarly named ECircles, this unique service makes it easy to create and administer a public or private mailing list. Users can participate by e-mail or by visiting the EGroups Web site, where the same discussions appear as threaded message forums. The site also provides your group with online polls, a calendar, and folders into which users can upload files for sharing. EGroups is so useful that we won't carp about the brief ads it appends to mailing-list messages–which are occasionally longer than the missives they accompany.

ECircles Puts Your **Group** in the Loop

SERVICE	What's hot	What's not	Bottom line
Delphi (www.delphi.com)	Strong message board and chat; customize it at will.	Jumbled look and feel (undergoing makeover at press time).	Fine for advanced users, overkill for casual types.
BEST ECircles (www.ecircles.com)	Simple and fun; great message board, photo album, and more.	No chat rooms at press time, but stay tuned.	In the winner's circle.
EGroups (www.egroups.com)	Easy mail list management; you can poll others, share files.	Tacks ads onto messages; chat unavailable at press time.	Mailing lists for the rest of us–nicely done.
Excite Communities (www.excite.com)	Quick setup; offers chat room, photo album, and file sharing.	Message board doesn't permit threaded discussions.	Like Yahoo Clubs but less refined.
Yahoo Clubs (clubs.yahoo.com)	Low-key ads; good chat room, plus calendar and photo album.	Like Excite, it doesn't allow threaded discussions.	Good for chat, but message board needs work.

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hard drive. Once you're up and running, you'll experience a full-screen, dynamic, virtual game show with continually updated topics and questions—and a whole lot of attitude. Very clever, very funny, lots of fun.

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SPIN DOCTOR: Spinner.com lets you play DJ, choosing from more than 100 music channels on the Web.

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Dr. Koop's Community Of the many medical-reference sites out there, Dr. Koop's Community (yes, it's that Dr. Koop—C. Everett, former surgeon general) offers the best interactivity. You can pick from a library of online resources, including a medical encyclopedia and an online pharmacy, or select topics alphabetically from the home page's drop-down menu. But the Interactive Community section is the real story. You can join message-board support forums with other users (for quitting smoking, say), or tune in to regular chat sessions with medical experts.

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WHAT A **BARGAIN**

FreeShop Free stuff galore—that's the operating principle of FreeShop, which features a wide array of items like free issues of magazines, catalogs, trialware, product samples, and lots of contests from hundreds of companies. A cool little bot called the FreeShop Shopping Assistant scans the Internet for the best posted deals among a variety of categories. One thing to watch for: FreeShop shares registration info with partners and third-party dealers, so you'll probably get junk mail and spam. You can have yourself removed from the database, but you'll miss out on certain promotions.

www.freeshop.com

THE **WEB'S** THE GAME

Shockrave Macromedia's playground/showcase for the latest and greatest in interactive Web goofiness. Here you'll find dozens of cool games that work directly through your browser via Java and Macromedia's own Shockwave technology. (You have to download the Shockwave plug-in, but the process is fast and painless.) Check out the Arcade section for scaled-down replicas of your favorite eighties' coin-operated video games.

www.shockrave.com

EVERYONE'S A **CRITIC**

The Internet Movie Database Ever find yourself mildly obsessed with a film after you get home from the theater? Maybe it's a plot point you can't resolve, or an actor you can't quite place. The celebrated Internet Movie Database features more than 170,000 movie titles, each expertly cross-referenced and hyperlinked. For each entry you'll find reviews; trivia; full cast and credit listings; VHS, DVD, and laserdisc information; links to official and unofficial fan sites; and much, much more.

www.imdb.com

Harry McCracken is a senior writer for PC World. *Glenn McDonald is a freelance writer based in San Francisco.* ■

Best Places to Start

online

THEY SAY CHARITY begins at home. We couldn't agree more. At PC World Online (www.pcworld.com), you'll find many fine free services. Searching for a place to hang your @? Check out MyWorldMail (www.myworldmail.com). Looking for a great utility? FileWorld (www.fileworld.com) offers 5000 of the best shareware and freeware packages around, including all files mentioned in this article. Finally, don't waste time waiting for tech support; sign up for your daily dose of software smarts at TipWorld (www.tipworld.com). Then stop by Games.net for suggestions on better ways to spend your personal time.

FREE ADVICE
TOP TIPS FOR WEB FREELOADERS

1 Surf off-peak. Web-based services, file downloads, and other online activities will be quicker if you avoid the Internet's rush hours—5 p.m. to 2 a.m. EST. Check the Internet Traffic Report (www.internettrafficreport.com) for up-to-the-moment alerts on Net congestion.

2 Question carefully. Hotmail and other Web services ask you to provide a question and an answer when you sign up; if you forget your password, they'll ask you the question to verify your identity. But any joker with a Web browser can view your question—so don't use one with an easy answer that even casual acquaintances might know (Mom's maiden name or your favorite pet, for example), even if the site suggests you do that.

3 Say thanks, but no thanks. When you register for free Web stuff, keep an eagle eye out for a check box that invites the site (and its partners) to pelt you with e-mailed "special offers"—in other words, ads. Unless you are a junk-mail junkie, feel free to deselect it.

4 Open a spam box. It's impossible to sidestep unwanted mail completely if you sign up for free Web services. Keep it from cluttering your in-box by using a free e-mail service to sign up (see "Message in a Portal," page 120), not your primary e-mail account.

5 Don't bet your business. Server crashes, security holes, and unforeseen downtime run rampant on the Web. And it's a safe bet that a few of the sites here will go out of business without warning. In other words: Don't depend on them for mission-critical work.

IT'S HARD TO TELL THE DIFFERENCE BETWEEN QUANTEX AND THE COMPETITION...

intel inside
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THE *NEW* QUANTEX **QP6/500 SM-4X SE**, MUCH MORE THAN THE SUM OF ITS PARTS.

Pentium® III processor 500MHz—turbo charged power and speed for next-generation Internet technology.

Voodoo3 3000 Graphics—explosive 3D rendering, world's fastest 128-bit 2D engine, ultra-high resolution display; TV-out support.

Sony CD-RW Drive—incredible 24x max variable speed reading, 4x recording for creating CDs, storing and transporting files.

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Quantex introduces a blazing Intel Pentium® III processor-based system with the smartest array of components available anywhere.

The Quantex QP6/500 SM-4x SE delivers raw 500MHz power and distortion-free images on our state-of-the-art 19-inch Natural Flat Monitor.

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"The Quantex [QP6/500 SM-4x SE] was the fastest in this bunch...fantastic machine with great performance and a good price." *Windows Magazine*

TOP 20 POWER DESKTOPS, QP6/500 SM-4X SE—MAY 1999
"It comes equipped with just about everything a small workgroup or home office might need, from top-notch performance to an attractive array of multimedia features..." *PC World*

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- ■ 128MB PC100 SDRAM Memory (384MB max.)
- ■ 512KB Secondary Cache
- ▲ 20GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- ▲ 19" Monitor w/Diamondtron Natural Flat CRT
  Revolutionary Flat-Faced CRT Technology (18" viewable, .25dp)
- ▲ *New* 3Dfx Voodoo3 3000 2x AGP Video, 16MB, TV-out
- ▲ Sony CD-RW Drive
  (24x max variable speed CD/4x CD-R/2x CD-RW)
- ■ 6x Max Variable Speed DVD-ROM Drive
- ■ US Robotics 56K V.90 Winmodem* w/Telephony
- ■ 10MB Ethernet Port, *Cable Modem Ready*
- ▲ *New* Aureal Vortex2 PCI Sound, A3D 2.0 Technology
- ■ Altec-Lansing ADA-305 Dolby Pro Logic Surround Sound Speakers, Subwoofer
- ■ Quantex highly-expandable ATX Mid Tower Case
- ■ MS Natural Keyboard Elite; MS IntelliMouse
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System Order Code: pcw06s10

DESKTOPS FOR HOME AND OFFICE

QP6/450 SM-3x $1999

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System Order Code: pcw06s05
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- ▲ 128MB PC100 SDRAM Memory
- ■ 512KB Secondary Cache
- ■ 17GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- ▲ 19" Monitor w/Diamondtron Natural Flat CRT
  Revolutionary Flat-Faced CRT Technology (18" viewable, .25dp)
- ▲ *New* 3Dfx Voodoo3 2000 2x AGP Video w/16MB
- ■ Internal 100MB Zip Drive. one free cartridge
- ■ US Robotics 56K V.90 WinModem* w/Telephony
- ■ 6x Max Variable Speed DVD-RDM Drive
- ▲ *New* Aureal Vortex2 PCI Sound, A3D 2.0 Technology
- ■ Altec-Lansing ACS-45.1 PowerCube Speakers, Subwoofer
- ■ Quantex highly-expandable ATX Mid Tower Case
- ■ *New* Internet-ready, multi-function Keyboard; MS IntelliMouse
- ■ MS Windows 98
- ■ MS Office 97 SBE v2.0 *(FREE MS Office 2000 upgrade offer*)*
- ■ 3-year Limited Warranty, 1-year On-Site Service**

QP6/500 SM-3x(w/Pentium III processor 500MHz)....$2199
System Order Code: pcw06s06

QP6/450 Best Buy $1599

Business lease:$58/Mo., 36 Mos. *$0 Money Down*
System Order Code: pcw06m09
- ▲ *New* Intel® Pentium® III Processor 450MHz
- ▲ 128MB PC100 SDRAM Memory
- ■ 512KB Secondary Cache
- ■ 13GB Ultra ATA Hard Drive
- ■ 3.5" 1.44MB Floppy Drive
- ▲ 19" Digital Monitor (18.1" viewable, 1600x1200)
- ■ 3Dfx 128-bit Voodoo Banshee 3D AGP Video w/16MB
- ■ 56K V.90 Telephony Fax/Modem*
- ■ 4.8x Max Variable Speed DVD-RDM Drive
- ■ Sound8laster AudioPCI Wavetable 3D Sound
- ■ 3-piece Dynamic Stereo Speakers, Subwoofer
- ■ Quantex highly-expandable ATX Mid Tower Case
- ■ 104-Key Keyboard; MS Mouse
- ■ MS Windows 98; Value Multimedia Software Bundle
- ■ Corel WordPerfect Office Suite B
- ■ 3-year Limited Warranty, 1-year On-Site Service**

QP6/500 Best Buy(w/Pentium III processor 500MHz)..$1799
System Order Code: pcw06m10

QP6/400 M-2x $1199

Business lease:$59/Mo., 24 Mos. *$0 Money Down*
System Order Code: pcw06m05
- ■ Intel® Pentium® II Processor 400MHz
- ■ 64MB PC100 SDRAM Memory
- ■ 512KB Secondary Cache
- ■ 8GB Ultra ATA Hard Drive
- ■ 3.5" 1.44MB Floppy Drive
- ■ 17" Digital Monitor w/OSD (15.8" viewable)
- ■ Intel740 3D 2X AGP Graphics with 8MB SDRAM
- ■ 56K V.90 Telephony Fax/Modem*
- ■ 4.8x Max Variable Speed DVD-RDM Drive
- ■ 128-Voice PCI Wavetable 3D Sound & Speakers
- ■ Quantex highly-expandable ATX Mid Tower Case
- ■ 104-Key Keyboard; MS Mouse
- ■ MS Windows 98; Value Multimedia Software Bundle
- ■ Corel WordPerfect Office Suite B
- ■ 3-year Limited Warranty, 1-year On-Site Service**
- ■ *Optional Internal Zip Drive w/one cartridge, add $79*

QP6/466 M-2c(w/Intel Celeron processor 466MHz).....$1149
System Order Code: pcw06m13

QP6/333 M-1c $899

Business lease:$52/Mo., 24 Mos. *$0 Money Down*
System Order Code: pcw06m00
- ■ Intel® Celeron™ Processor 333MHz
- ■ 64MB SDRAM Memory
- ■ 12BKB Secondary Cache
- ■ 6GB Ultra ATA Hard Drive
- ■ 3.5" 1.44MB Floppy Drive
- ■ 15" Digital Monitor (13.8" viewable)
- ■ 64-bit 3D AGP Graphics Accelerator w/4MB
- ■ 56K V.90 Telephony Fax/Modem*
- ■ 32x Max Variable Speed CD-ROM Drive
- ■ 12B-Voice PCI Wavetable 3D Sound & Speakers
- ■ Quantex highly-expandable ATX Mid Tower Case
- ■ 104-Key Keyboard; MS Mouse
- ■ MS Windows 98; Value Multimedia Software Bundle
- ■ Corel WordPerfect Office Suite B
- ■ 3-year Limited Warranty, 1-year On-Site Service**
- ■ *Upgrade to 17" Digital Monitor (15.8" viewable), add $79*

QP6/466 M-1c(w/Intel Celeron processor 466MHz).....$999
System Order Code: pcw06m14

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128MB SDRAM (up to 384MB max)—super-fast performance on high-end applications with plenty of room for growth.

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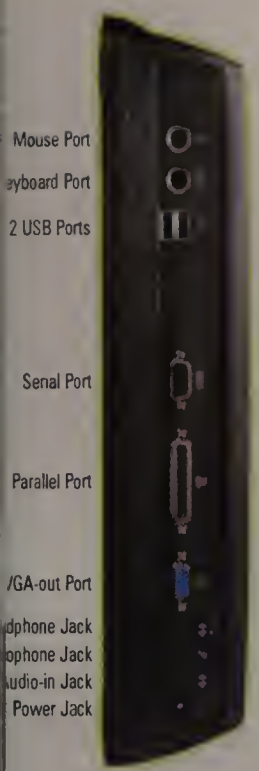
Actual component placement may vary.

intel inside pentium® II PROCESSOR

The Quantex I-1511, the most powerful dual-purpose laptop available. Fast enough for the most demanding desktop applications, light enough to be the perfect road companion.



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- ■ 56K V.90 Fax/Modem*
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- ▲ ATI Rage Lt Pro 3D AGP Video w/8MB
- ■ ESS 3D Wavetable Surround Sound and Speakers
- ■ Long-Lasting 12-cell Smart Lithium Ion Battery
- ■ USB and Fast IR Ports; Integrated Personal Touchpad
- ■ MS Windows 98
- ■ MS Office 97 SBE v2.0 *(FREE MS Office 2000 Upgrade offer#)*
- ■ Quantex Deluxe Carrying Case - *Limited time offer!*
- ■ 3-Year Limited Warranty on CPU and Main Memory
- ■ 1-Year Parts and Labor Warranty on all other Components

$3199

Business lease: $109/Mo., 36 Mos. *$0 Money Down*
System Order Code: pcw06i11

BEST BUY AWARD—APRIL 1999

"...the power and convenience of the I-1410 make it an excellent value...it's loaded with features that are sure to satisfy even the most demanding users ." *Laptop Buyer's Guide & Handbook*

EDITORS' CHOICE AWARD—JANUARY 1999

"By far the fastest of all the notebooks here...Quantex has definitely dotted all of the *i's* on the I-1410." *C/Net* (Online)

I-SERIES "DESKTOP REPLACEMENT" NOTEBOOKS

Quantex I-1510 $2599

usiness lease: $94/Mo., 36 Mos. *$0 Money Down*
ystem Order Code: pcw06i07

- Intel Pentium® II processor 333MHz
- 256K Performance Enhanced on-die cache
- 15" XGA Active Matrix Display
- 64MB SDRAM, 6GB Ultra ATA HD
- 56K V.90 Fax/Modem*
- Modular 2x Max Variable DVD-ROM & 3.5" Floppy Combo Drive
- ATI Rage Lt Pro 3D AGP Video w/8MB
- ESS 3D Wavetable Surround Sound and Speakers
- Long-Lasting 12-Cell Smart Lithium Ion Battery
- USB and Fast IR Ports; Integrated Personal Touchpad
- MS Windows 98; Corel WordPerfect Office Suite B
- Quantex Deluxe Carrying Case - *Limited time offer!*
- 3-year limited warranty on CPU and Main Memory
- 1-Year parts and labor warranty on all other components
- *Upgrade from 64MB to 128MB SDRAM, add $149*
- *Upgrade to 4x Max Variable speed DVD-ROM/FDD Combo Drive, add $69*

uantex I-1510 w/Pentium II processor 300MHz.....$2499
ystem Order Code: pcw06i06

Quantex I-1410 $2399

Business lease: $86/Mo., 36 Mos. *$0 Money Down*
System Order Code: pcw06i04

- ▲ Intel Pentium® II processor 333MHz
- ■ 256K Performance Enhanced on-die cache
- ■ 14.1" XGA Active Matrix Display
- ■ 64MB SDRAM
- ■ 6GB Ultra ATA HD
- ■ 56K V.90 Fax/Modem*
- ▲ *New* Modular 4x Max Variable DVD-ROM & 3.5" Floppy Combo Drive
- ▲ ATI Rage Lt Pro 3D AGP Video w/8MB
- ■ ESS 3D Wavetable Surround Sound and Speakers
- ■ Long-Lasting 12-Cell Smart Lithium Ion Battery
- ■ USB and Fast IR Ports; Integrated Personal Touchpad
- ■ MS Windows 98; Corel WordPerfect Office Suite 8
- ■ Quantex Deluxe Carrying Case - *Limited time offer!*
- ■ 3-year limited warranty on CPU and Main Memory
- ■ 1-Year parts and labor warranty on all other components
- ■ *Upgrade to 8GB Ultra ATA Hard Drive, add $199*

Quantex I-1410 w/Pentium II processor 366MHz.....$2599
System Order Code: pcw06i05

T-SERIES "MOBILE WARRIOR" NOTEBOOKS

Quantex T-1400 $2199

Business lease: $79/Mo., 36 Mos. *$0 Money Down*
System Order Code: pcw06t04

- ▲ Intel Pentium® II processor 333MHz
- ■ 256K Performance Enhanced on-die cache
- ▲ Ultra-Thin Design (12.44"x9.84"x1.43")
- ■ 14.1" XGA Active Matrix Display
- ■ 64MB SDRAM; 6GB Ultra ATA HD
- ■ 56K V.90 Fax/Modem*
- ■ Modular 24x Max Variable Speed CD-ROM Drive
- ■ 3.5" Modular Floppy Drive
- ■ NeoMagic NMG5 128-bit AGP Video
- ■ Integrated 16-bit Stereo Sound and Speakers
- ■ Smart Lithium Ion Battery
- ■ USB and Fast IR Ports; Integrated Personal Touchpad
- ■ MS Windows 98; Corel WordPerfect Office Suite 8
- ■ Quantex Carrying Case - *Upgrade to Deluxe Carrying Case for $89*
- ■ 3-year limited warranty on CPU and Main Memory
- ■ 1-Year parts and labor warranty on all other components

Quantex T-1400 w/Pentium II processor 366MHz.....$2399
System Order Code: pcw06t05

Quantex T-1330 $1899

Business lease: $68/Mo., 36 Mos. *$0 Money Down*
System Order Code: pcw06t00

- ■ Intel Pentium® II processor 300MHz
- ■ 256K Performance Enhanced on-die cache
- ▲ Ultra-Thin Design (12.44"x9.84"x1.37")
- ■ 13.3" XGA Active Matrix Display
- ■ 32MB SDRAM; 4GB Ultra ATA HD
- ■ 56K V.90 Fax/Modem*
- ■ Modular 24x Max Variable Speed CD-ROM Drive
- ■ 3.5" Modular Floppy Drive
- ■ NeoMagic NMG5 128-bit AGP Video
- ■ Integrated 16-bit Stereo Sound and Speakers
- ■ Smart Lithium Ion Battery
- ■ USB and Fast IR Ports; Integrated Personal Touchpad
- ■ MS Windows 98; Corel WordPerfect Office Suite 8
- ■ Quantex Carrying Case - *Upgrade to Deluxe Carrying Case for $89*
- ■ 3-year limited warranty on CPU and Main Memory
- ■ 1-Year parts and labor warranty on all other components

Quantex T-1330 w/Pentium II processor 333MHz.....$1999
System Order Code: pcw06t01

Notebook Upgrade Options: ■ Quantex Mini-Docking Station...add $149 ■ Smart Lithium Ion Battery...add $129 ■ PCMCIA Network Interface Card...add $129 ■ Quantex Deluxe Carrying Case...add $89 ■ Internal Zip Drive (T-Series Only)...add $149 ■ Upgrade from 64MB SDRAM to 128MB SDRAM...add $149 ■ Upgrade from 6GB HD to 10GB Ultra ATA HD...add $299

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Actual component placement may vary.

QX-SERIES SERVERS

Quantex QX6400 $7699

Business lease:$259/Mo., 36 Mos. *$0 Money Down*
System Order Code: pcw06q22

- ▲ *New* Intel® Pentium® III Xeon™ Processor 500MHz (Quad Processor Upgradeable)
- ▲ 256MB PC100 ECC SDRAM (4GB Max)
- ■ 512KB Full Speed ECC Secondary Cache
- ▲ Three 9GB Ultra2/LVD SCSI Hot Swap Hard Drives
- ▲ AMI MegaRAID 438 Dual Channel SCSI Controller, 16MB, Battery Backup Unit
- ■ Intel EtherExpress Pro 100 Fast Ethernet w/RJ-45
- ■ Dual Channel Ultra2 (LVD) SCSI / Single Channel SCSI Controller
- ■ Dual Peer PCI Buses; 6 PCI Slots, 1 shared PCI/ISA Slot
- ■ 40x Max Variable Speed SCSI CD-ROM Drive
- ■ Quantex QX6400 Server Case; 2+1 400w Redundant Power Supplies; 6 Hot-Swap Drive Bays; up to 11 fans
- ■ Emergency Management Port; ISC Management Console
- ■ Chassis-intrusion switch; Drive bay lock
- ■ 104-Key Keyboard; MS Mouse
- ■ 3-Year Limited Warranty, 1-Year On-Site Service**
- ■ 24/7 Toll-Free Dedicated Server Hardware Support

Quantex QX6200 $4299

Business lease:$147/Mo., 36 Mos. *$0 Money Down*
System Order Code: pcw06q25

- ▲ *New* Intel® Pentium® III Xeon™ Processor 550MHz (Dual Processor Upgradeable)
- ▲ 128MB PC100 ECC SDRAM (2GB Max)
- ■ 512KB Full Speed ECC Secondary Cache
- ▲ 9GB Ultra2/LVD SCSI Hot Swap Hard Drive
- ■ Intel EtherExpress Pro 100 Fast Ethernet w/RJ-45
- ■ Dual Channel SCSI Controller; Ultra2 (LVD) SCSI /Ultra-Wide SCSI
- ■ Dual Peer PCI Buses; 6 PCI Slots, 1 ISA Slot
- ■ 40x Max Variable Speed SCSI CD-ROM Drive
- ■ Quantex QX6200 Server Case; 2+1 400w Redundant Power Supplies; 6 Hot-Swappable Drive Bays; 6 fans
- ■ Emergency Management Port; ISC Management Console
- ■ Chassis-intrusion switch; Drive bay lock
- ■ 104-Key Keyboard; MS Mouse
- ■ 3-Year Limited Warranty, 1-Year On-Site Service**
- ■ 24/7 Toll-Free Dedicated Server Hardware Support
- ■ *Add AMI MegaRAID 438 Dual Channel SCSI Controller with 16MB & Battery Backup Unit for $1299*

Quantex QX5000 $2499

Business lease:$90/Mo., 36 Mos. *$0 Money Down*
System Order Code: pcw06q11

- ▲ *New* Intel® Pentium® III Processor 500MHz (Dual Processor Upgradeable)
- ▲ 128MB PC100 ECC SDRAM (2GB Max)
- ■ 512KB ECC Secondary Cache
- ▲ 9GB Ultra2/LVD SCSI Hot Swap Hard Drive
- ■ Intel EtherExpress Pro 100B Fast Ethernet w/RJ-45
- ■ Dual Channel SCSI Controller; Ultra2 (LVD) SCSI /Ultra-Wide SCSI
- ■ Dual Peer PCI Buses; 6 PCI Slots, 1 ISA Slot
- ■ 40x Max Variable Speed SCSI CD-ROM Drive
- ■ Quantex QX5000 Server Case 5 Hot-Swappable Drive Bays; 4 fans
- ■ Emergency Management Port; ISC Management Console
- ■ Chassis-intrusion switch; Drive bay lock
- ■ 104-Key Keyboard; MS Mouse
- ■ 3-Year Limited Warranty, 1-Year On-Site Service**
- ■ 24/7 Toll-Free Dedicated Server Hardware Support
- ■ *Add Windows NT Server 4.0 w/10 CAL for $799*
- ■ *Add Adaptec SCSI RAID Controller for $399*

Quantex QX3000 $1499

Business lease:$54/Mo., 36 Mos. *$0 Money Down*
System Order Code: pcw06q02

- ▲ *New* Intel® Pentium® III Processor 450MHz
- ■ 64MB PC100 ECC SDRAM
- ■ 512KB ECC Secondary Cache
- ■ 4.5GB Ultra-Wide SCSI Hard Drive
- ■ Intel EtherExpress Pro 100B Fast Ethernet w/RJ-45
- ■ Single Channel Ultra-Wide SCSI Controller
- ■ 3 PCI Slots, 1 ISA Slot, 1 Shared PCI/ISA Slot
- ■ 40x Max Variable Speed CD-ROM Drive
- ■ Quantex QX3000 Mid Tower Server Case 4 Internal 3.5" Bays, 4 External 5.25" Bays
- ■ Emergency Management Port; ISC Management Console
- ■ 104-Key Keyboard; MS Mouse
- ■ 3-Year Limited Warranty, 1-Year On-Site Service**
- ■ 24/7 Toll-Free Dedicated Server Hardware Support
- ■ *Add APC Smart-UPS 700VA for $349*

intel inside pentium® III xeon™

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The latest generation of **removable drives** finally gives the **ubiquitious Zip** some serious competition.

X-RAY PHOTOGRAPHY: JIM WEHTJE; PRODUCT PHOTOGRAPHY: KEVIN CANDLAND

WITH APOLOGIES to Mark Twain, reports of the death of the floppy disk have been greatly exaggerated. Every year, as companies roll out new high-capacity media, the obituaries get rewritten. But the venerable 3.5-inch floppy disk lives on, like a wily old cat with more lives than good sense.

So why is it still around? Because new PCs still come with floppy drives. But removable-media drives offer much larger storage capacities and better transportability. The first Iomega Zip drive I bought almost four years ago still serves daily duty as a repository of each day's writing work. And my wife, a tax accountant, uses Zip cartridges for archiving her clients' files. Small businesses ▶

BY STAN MIASTKOWSKI

Floppy Killers?

whose computers aren't networked can use removable media to "sneakernet"—a way of sharing large files among PCs by walking a disk from one system to another. Removable-media drives also make uploading and downloading huge graphics files much speedier.

To compare the latest batch of high-capacity media, we looked at 13 drives from six manufacturers. Iomega, which dominates the market, offers six of the products we review here, ranging from the classic but slow parallel port 100MB Zip to the fast 2GB SCSI Jaz drive. Joining Iomega's bread-and-butter 100MB Zip line is a new USB version. In addition, the company has cooked up a drive that uses 250MB Zip cartridges, and the $299 Clik, a tiny, battery-powered drive that uses 40MB cartridges the size of silver dollars. Because Clik is designed to work primarily with digital cameras and palmtop PCs, we didn't test it in this roundup. (For a review, see April's *New Products*, www.pcworld.com/apr99/clik.) Hinting at what we may expect to see in the future, Iomega spokesperson Jonathan Graham says the company is also "looking at other technologies such as FireWire, DVD-ROM, and CD-Rewritable."

Meanwhile, Sony's long-awaited 200-MB HiFD debuted badly. CompUSA quietly pulled the first units off the shelves after Sony discovered some performance glitches. Indeed, at press time, Sony said it would not release the HiFD again until this fall, by which time it expected to have the problems ironed out. Also on the horizon is a 123MB HiFD drive from Samsung, currently dubbed the Pro-FD, due before the end of the year.

New drives in the review include Caleb's UHD144 and Castlewood's fast Orb drive. Before the holidays, Caleb promises to offer a $99 parallel port version of its UHD144, while Castlewood plans to offer $199 parallel, $199 SCSI, and $249 USB versions of the Orb.

The remaining drives we tested use the 120MB SuperDisk (aka LS-120) format developed by 3M spin-off Imation. Nearly as common as Zips, SuperDisks owe much of their popularity to their compatibility with standard 1.44MB floppies. Imation says it is "considering other interfaces" to add to its parallel port SuperDisk drive, but declined to be more specific. The company sells a USB version, but for the Apple iMac only. It plans to offer a higher-performance SuperDisk in the next few months, though the details weren't available at press time.

Low cost, high capacity, and ease of use make **removable-media** drives a terrific storage option.

REMOVABLE MEDIA DRIVES FEATURES COMPARISON

PRODUCT	Street price (3/15/99)	Basic features: Connection [1]	Disk type	Disk capacity	Disk street price [2]	Drive width x depth x height (inches)	Drive weight (pounds)	Reads/writes 1.44MB floppies	Bootable drive [3]
Caleb UHD144 303/786-9600 www.caleb-stor.com	$79	IDE	UHD	144MB	$8	4 x 5.9 x 1	1.2	●	●
Castlewood Orb 2.2GB 925/461-5500 www.castlewood.com	$200	EIDE	Orb	2.2GB	$30	4 x 6 x 1	1	○	●
Hi-Val 120MB SuperDisk 714/953-3000 www.hival.com	$100	IDE	SuperDisk	120MB	$10	4 x 6 x 1	1	●	●
Imation SuperDisk Parallel Port Drive 888/466-3456 www.superdisk.com	$150	parallel	SuperDisk	120MB	$17	5.9 x 8.8 x 1.5	2.5	●	○
Iomega Jaz 2GB External 800/697-8833 www.iomega.com	$350	SCSI	2GB Jaz	2GB	$125	5.3 x 8 x 1.5	2	○	●
Iomega Zip 100 External Parallel Port 800/697-8833 www.iomega.com	$100	parallel	Zip 100	100MB	$15	5.4 x 7.1 x 1.5	1	○	○
Iomega Zip 100 External SCSI 800/697-8833 www.iomega.com	$100	SCSI	Zip 100	100MB	$15	5.4 x 7.1 x 1.5	1	○	○
Iomega Zip 250 SCSI 800/697-8833 www.iomega.com	$200	SCSI	Zip 250	250MB	$20	5.5 x 7 x 1.5	1	○	○
Iomega Zip ATAPI Internal 800/697-8833 www.iomega.com	$100	IDE	Zip 100	100MB	$15	5.4 x 7.1 x 1.5	1	○	●
Iomega Zip USB 100MB External 800/697-8833 www.iomega.com	$130	USB	Zip 100	100MB	$15	5.4 x 7.1 x 1.5	1	○	○
Winstation Systems IDE SuperDisk 800/243-3475 www.winstation.com	$99	IDE	SuperDisk	120MB	$12	4 x 6 x 1	1	●	●
Winstation Systems SCSI SuperDisk External 800/243-3475 www.winstation.com	$229	SCSI	SuperDisk	120MB	$12	6.6 x 8.6 x 2.1	3.5	●	○
Winstation Systems USB SuperDisk 800/243-3475 www.winstation.com	$159	USB	SuperDisk	120MB	$12	5.5 x 8.5 x 1.8	3	●	○

Best Buy ● Yes ○ No

[1] SCSI drives we tested do not include an adapter board.

[2] Because SuperDisk and Zip media are not sold singly, disk price is based on the vendor's price for the smallest available pack.

[3] Only the BIOSs on relatively new systems can perform this feature.

Best Deals in Town

Iomega Zip USB 100MB

Castlewood Orb 2.2GB

IF YOU NEED a lean, mean backup machine, check out Castlewood's Orb 2.2GB. At $200, it's the best deal of the bunch, offering outstanding speed, huge storage capacity, and useful utilities. If ease of use is your main concern, Iomega's Zip USB 100MB should be at the top of your list. Among the drives we reviewed, it's by far the easiest to install, letting you plug and play without turning off your PC.

Though new competitors and technologies continue to challenge Iomega's dominance in the removable-media market, the past year has seen some casualties as well. SyQuest and Avatar Systems, creator of the 250MB Shark drive, filed for Chapter 11 bankruptcy protection. At press time, SyQuest was still offering product repairs to its customers, and Iomega had acquired SyQuest's technologies but was neither selling nor supporting SyQuest drives. Also, Maxell, though not bankrupt, stopped manufacturing its line of SuperDisk drives as we went to press—a shame because its affordable, parallel port SuperDisk drive performed well in our tests. You can still buy Avatar, Maxell, and SyQuest products through some online mail-order catalogs, but make sure the necessary media is available, too.

		Support policies				
	Bundled software	Parts/labor warranty (years)	Weekday/weekend toll-free support hours	Tech support fee per problem [4]	Comments	Product info number [5]
Castlewood Orb 2.2GB	○	1/1	9 [6]/none	free	Least expensive, sufficient capacity, satisfactory performance.	617
Iomega Zip USB 100MB	●	1/1	12/none	free	Fastest, highest capacity, media offers best dollar-per-MB value, useful bundled software.	618
Castlewood Orb Parallel	○	1/1	24/24	free	Affordable, but slow performance.	619
Iomega Zip Parallel	●	1/1	12/none	free	Portable, but poky performance.	620
Iomega Jaz USB	●	1/1	15/7	$15	Industry standard among high-capacity drives, but very expensive.	621
Iomega Jaz Parallel	●	1/1	15/7	$15	Cheap and portable, but very slow.	622
Iomega Jaz SCSI	●	1/1	15/7	$15	Speedy, good value, but can be hard to install.	623
Iomega Zip SCSI	●	1/1	15/7	$15	Next-generation Zip with lavish storage space and tip-top speed.	624
Iomega Zip Parallel	●	1/1	15/7	$15	Affordable, middle-of-the-road performer, ubiquitous.	625
Iomega Zip EIDE	●	1/1	15/7	$15	Easiest to install, but runs slower than we expected.	626
Castlewood Orb EIDE	○	1/1	9/none	free	Sluggish, insufficient documentation.	627
Castlewood Orb SCSI	○	1/1	9/none	free	Pricey, slowest among SCSI drives we tested, hard to install, subpar manual.	628
Castlewood Orb USB	○	1/1	9/none	free	Easy to install, but has lackluster performance.	629

[4] For Iomega products, no charge on first call within 30 days of ownership or if the problem stems from the drive itself.

[5] For more information about all products in this table, select product info number 910 or visit www.pcworld.com/productinfo.

[6] No toll-free support.

STORAGE ALTERNATIVES

AS HARD DISK sizes increase and prices fall, adding a second hard drive is becoming a better storage option than buying some of the removable devices here.

In addition, optical drives such as CD-Recordable and CD-Rewritable drives are catching on. They offer a longer estimated life span—100 years, as opposed to 10 to 20 years for magnetic disks—and more capacity (around 650MB). CD-R/RW discs also cost about $5 less than the cheapest removable-media disk in this review, Caleb's $8 UHD144 disk. And a CD-R/RW disc can be shared with nearly any PC equipped with a CD-ROM drive, allowing you to transfer discs from system to system. However, whereas CD-R/RW media are dirt-cheap, the drives are expensive—$350 to $400, compared with $79 to $350 for the devices in this roundup.

Online backup services like Atrieva, Connected Online Backup, and Evault also serve as storage alternatives. With these services, you send your compressed, encrypted data through the Internet, and the firms store your data on secure servers. However, online backup services aren't the most convenient way to transfer files, and their fees are high, averaging $20 per month. (Atrieva is free, but you're bombarded with ads.) Plus, it can take a *long* time to upload files onto the Web using a 56-kbps modem.

Ultimately, low cost, high capacity, and ease of use make some of the removable-media drives we reviewed your best bet. When buying, choose an interface (the connection between your PC and your drive) that suits your needs. The devices here come in five interface types—EIDE, IDE, parallel, SCSI, and USB. EIDE ▶

and SCSI drives perform the fastest but may be hard to install. USB drive setup, on the other hand, is a near no-brainer—assuming you have a computer with a USB connection (or a USB add-on card) and Windows 95 OSR2 or 98. For portability, consider either a parallel or USB drive—just remember that parallel devices can run painfully slow.

We evaluated each drive in five categories: overall cost (including the price of the drive and its media and availability of the products), ease of use (primarily setup), performance, features and design, and service and support. Most of the 13 drives we tested measured up well against our criteria. Our smooth experience with the majority of them says good things about the technologies on which they are based. Here's how the competitors stacked up.

COST CONSTRAINTS

HOT: Castlewood Orb 2.2GB
NOT: Winstation Systems SCSI SuperDisk External

THE CURRENT generation of removable-media drives range in price from $79 to $350, with many of the products hovering between $100 and $150. Bear in mind that the type of interface you choose affects the final cost of a drive. Removable-media devices that use the SCSI interface, for instance, usually fetch a premium because they are supposed to provide faster performance than other interfaces. However, our lab tests didn't support SCSI's claims—see our test report on page 148.

In addition, some SCSI drives, including the ones we tested from Iomega and Winstation, don't come with SCSI cards; you have to buy them separately. Iomega offers an optional $50 SCSI card for the 100MB and 250MB Zip, but for other SCSI drives like the Iomega Jaz and Winstation SuperDisk, you'll need to buy—for $50 to $100—an adapter from a vendor like Adaptec.

The price of the media also plays a role in the overall cost of these devices. Of the drives we tested, the Castlewood Orb takes the nod for best overall value. The Orb's $200 price seems like a big investment, but its giant-capacity 2.2GB cartridges cost just $30 each. Compare that with the Jaz: You'll shell out $350 for the drive alone, plus $125 for a 2GB cartridge.

Disks for the other drives we evaluated cost even less than the Orb cartridge. Iomega's 100MB Zip disks, probably the most popular removable media out there, have fallen in price, though not by as much as some would hope. Zips and SuperDisks typically go for $12 each in a three-pack or $10 each in a pack of ten. (SuperDisk and Zip media are not sold singly.) Caleb's UHD144 costs $8 per disk in packs of five. Sony's 200MB HiFD disks are expected to sell for around $15 each.

Drives from Hi-Val, Imation, Iomega, and Sony, along with their media, are sold in nationwide computer and electronics chains, by major computer mail-order vendors, and by Web suppliers. Winstation drives are harder to find, but you can get them direct from the company as well as through several Web sources. Their media, the SuperDisk, is widely available. The Caleb UHD144 and the Castlewood Orb are relatively new players, but the manufacturers of both say that their drives and media should be available at computer retailers throughout the country, so be sure to check your local stores.

In addition to cost and availability concerns, keep in mind the type of media that your peers use. Your lighting-fast Orb won't be of much use when you need to swap media with Zip-using coworkers. Indeed, the Zip has become ubiquitous in part because it *is* ubiquitous.

NEARLY PAINLESS SETUPS

HOT: Iomega Zip USB 100MB
NOT: Winstation Systems IDE and SCSI External SuperDisk

FOR REMOVABLE-MEDIA drives, easy to install means easy to use: Once set up, it works like any other drive on your PC. Setup complexity depends mostly on ▶

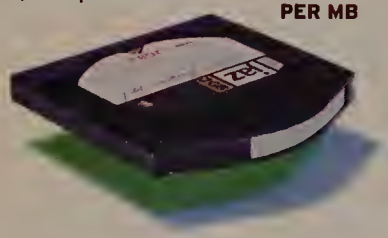
Disk Price per MB

CASTLEWOOD'S Orb offers the best disk-price-per-MB value. The venerable 1.44MB floppy is not only pricey but also holds very little data. The popular Zip isn't that economical, either.

SOURCE: Vendors' price for smallest available pack.

Cheapest
Orb 2.2GB
$30 per disk
1¢ PER MB

Jaz 2GB
$125 per disk
6¢ PER MB

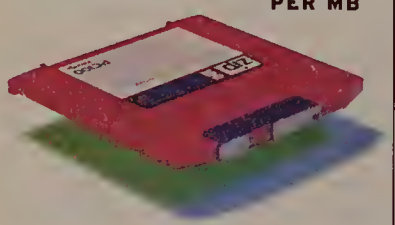


UHD144 144MB
$8 per disk
6¢ PER MB

SuperDisk 120MB
$10 per disk
8¢ PER MB

Zip 250 250MB
$20 per disk
8¢ PER MB

Zip 100 100MB
$15 per disk
15¢ PER MB



Most Expensive
Floppy 1.44MB
$.70 per disk
49¢ PER MB

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Think Gates.

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as Steve Jobs

Anthony Michael Hall
as Bill Gates

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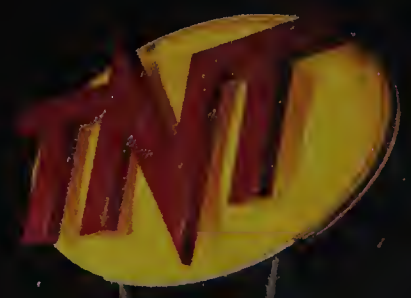

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Even among units with the same interface, **performance** in copying data varied widely.

the interface and whether the device is external or internal. By that measure, USB earns top honors for ease of use, followed by parallel port, EIDE, IDE, and SCSI.

USB drives provide smooth setups, especially since you don't need to power down your PC to install them. You plug the drive into a USB port and connect the power supply. Windows detects the drive and asks you to insert the driver disk. With both Iomega's Zip USB 100MB and Winstation's USB SuperDisk, we were up and running in minutes.

Parallel port drives are almost as easy to connect. Ideally, you turn off your PC, plug the drive in, and turn your PC back on. If a printer is already hooked up to the parallel port, you'll need to daisy-chain the printer to the drive. Imation's parallel port SuperDisk holds the edge here because of its on-screen info, even warning that your computer may freeze up while it detects the parallel port type. If it does freeze (ours didn't), you can just reboot.

Installing an internal EIDE or IDE drive is more complex, but it needn't be daunting. Briefly, every PC has two EIDE/IDE "channels," each of which supports two drives. One—usually the hard drive—is designated as the master, the other as the slave. (For more detailed advice, see "Five Tips for Healthy Drives," page 154.) Usually, you must set drive jumpers (often outlined on the drive itself or explained in the drive's manual) to make sure you don't have two masters or two slaves.

Clearly marked jumpers on EIDE and IDE drives help speed up installation. But that wasn't the case with Winstation's IDE drive: Its jumpers lack markings, and its manual comes only on CD-ROM, so you have to print out the instructions before shutting off the PC to install the drive.

SCSI devices also get a bad rap for difficult setups, but it's not always deserved. If your PC doesn't have a SCSI card, you'll have to put one in yourself, but that's not especially hard to do. (Our test PC was equipped with an Adaptec 2930U2 SCSI card.) Other SCSI installation procedures can make the process more laborious, including setting a switch on the drive to assign a unique SCSI ID number.

In addition, the type of connection cable bundled with a SCSI drive affects the setup process. All the SCSI drives we looked at, except the Winstation, include connection cables. However, Iomega continues to bundle its Zip drives with old-fashioned, 25-pin SCSI connectors that don't work with most of today's SCSI add-in cards. To hook up a SCSI-based Zip drive to an off-the-shelf SCSI card, you'll need a 50-pin SCSI cable, which costs about $25, and a $20 Iomega adapter.

If you've never installed a drive before, a well-organized manual would come in handy. Both Castlewood's and Iomega's drives come with fully illustrated manuals that take you step by step through the process and the options. Winstation, though, provides only a slip of paper telling you that the manual is on the CD-ROM. Worse, that manual is confusing, thin, and virtually useless for nonexperts.

SPEEDIN' ALONG

HOT: Castlewood Orb 2.2GB
NOT: Hi-Val 120MB SuperDisk

HIGH-SPEED ACCESS to large files, such as graphics or audio, begs for fast performance. But if the ability to move a drive easily from PC to PC is your top pri- ▶

TEST REPORT

Fast Orb and Jaz Rise to Top

Sluggish SuperDisk drives sink to the bottom.

DRIVE	Connection	Disk capacity	Total file transfer time[1] (Faster ◀)
Castlewood Orb 2.2GB*	EIDE	2.2GB	2.6
Iomega Jaz 2GB External	SCSI	2GB	3.2
Iomega Zip 250 SCSI	SCSI	250MB	4.1
Iomega Zip 100 External SCSI	SCSI	100MB	6.9
Iomega Zip ATAPI Internal	IDE	100MB	6.9
Iomega Zip USB 100MB External*	USB	100MB	10.4
Caleb UHD144	IDE	144MB	12.3
Winstation Systems SCSI SuperDisk External	SCSI	120MB	18.2
Iomega Zip 100 External Parallel Port	parallel	100MB	25.3
Winstation Systems USB SuperDisk	USB	120MB	25.5
Winstation Systems IDE SuperDisk	IDE	120MB	26.1
Imation SuperDisk Parallel Port Drive	parallel	120MB	27.3
Hi-Val 120MB SuperDisk	IDE	120MB	29.5

*Best Buy

Minutes 0 10 20 30

TEST PC WORLD CENTER

HOW WE TEST We tested all drives under Windows 98 on a Quantex QP6/350 M-2x Pentium II-350 PC with 64MB of RAM, 512KB of secondary cache, an 8.6GB Seagate ST-3B641A Ultra DMA hard disk, an STB Velocity 4400 AGP graphics card, and an Adaptec 2930U2 Ultra SCSI card. Using Windows Explorer, we copied 76MB of files and folders from the hard drive to the removable-media drive and back to the hard drive. Using WinZip, we then uncompressed a 45MB .zip file from the media to the hard disk, resulting in 95MB of uncompressed files. [1]Of all three tests.

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	16.8 GB UltraDMA Hard Drive[1]	16.8 GB UltraDMA Hard Drive[1]
	6X DVD-ROM Drive[5]	6X DVD-ROM Drive[5]
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	Diamond Monster Sound MX300 PCI Audio Card	Aureal 8820 PCI Audio Card
	6.0Mb Max Digital Modem[6]	56K ITU V.90 Modem[2]
	JBL Pro Studio w/Dual Subwoofers	JBL Pro Speakers
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	Microsoft® Office 97 Small Business Edition®	Home Phoneline Networking[7]
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52X True X CD-ROM Drive[9]	52X True X CD-ROM Drive[9]	6X DVD-ROM Drive[5]	52X True X CD-ROM Drive[9]
2X AGP Graphics w/8 MB SDRAM	2X AGP Graphics w/8 MB SDRAM	Diamond Viper 550 AGP w/16 MB SDRAM	2X AGP Graphics w/8 MB SDRAM
Aureal 8820 PCI Audio Card	Aureal 8820 PCI Audio Card	Diamond Monster Sound MX300 PCI Audio Card	Aureal 8820 PCI Audio Card
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JBL Pro Premium Speakers w/Subwoofer	JBL Pro Premium Speakers w/Subwoofer	JBL Pro Premium Speakers w/Subwoofer	JBL Pro Premium Speakers w/Subwoofer
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Iomega Zip 250 SCSI

Iomega Jaz 2GB External SCSI

IOMEGA'S fast 250MB Zip and 2GB Jaz are ideal for backing up a hard drive or for storing big graphics files.

ority, you'll have to submit to the leisurely (slow) speed of most parallel port drives.

In our *PC World* lab tests (see our test report on page 148), the EIDE-based Castlewood Orb blew away the competition. Even more surprising is how solidly the 2.2GB Orb beat the 2GB Iomega Jaz, which, with its SCSI interface, presumably should have been the better performer.

In our test copying data from a hard drive to the removable media drive—a common chore—performance varied widely, even among drives with the same interface. For example, we expected parallel port drives to be the slowest, and though the Iomega Zip 100 Parallel and Imation SuperDisk Parallel ranked near the bottom of the pack, the parallel port Sony HiFD beat out several other drives (see "Sony HiFD: Tease or Please?" below).

The Maxell SuperDisk we tested also delivered excellent performance, among the best we've seen in a parallel port drive. Unfortunately, the company halted production of this drive, though some retailers may still have a few in stock. Except for the parallel port Zip 100, Iomega drives of all interface types performed well, particularly the new Zip 250. In contrast, the three Winstation drives, each with a different interface, tended to trail behind their competitors in our performance tests.

Incidentally, most of the drives we tested did surprisingly well in playing back 30-frame-per-second full-motion AVI video, running them directly from the media. That's a useful feature for folks who run video during presentations. Frame rates lower than 29 frames per second make for choppy, unwatchable video. The worst performers—the IDE Winstation, the parallel port Zip, and the abysmally slow parallel port Imation SuperDisk, which ran video at just 7 frames per second—made video playback a nightmare.

HANDY FEATURES

HOT: Castlewood Orb 2.2GB
NOT: Winstation Systems SCSI External and USB SuperDisk

WHEN YOU'RE PAYING over a hundred bucks for a removable drive, you might hope to get a few extras beyond the box itself. For example, all the models here, except for the Castlewood and Iomega drives, read and store data onto standard 1.44MB floppies. Drives that accept regular floppies make file sharing convenient.

Some drives we reviewed allow you to boot your PC directly from their media. The Caleb UHD144, Castlewood Orb, Hi-Val SuperDisk, Iomega Jaz and Zip ATAPI, and Winstation IDE SuperDisk can be used this way, but there are a few complications. For instance, only the BIOSs on relatively new PCs can handle this feature.

We also looked at each drive's industrial design. Most of the internal drives feature just a slot for the media and an activity light. Winstation's external drives come with a detachable vertical stand for saving precious desk space, but these drives lack utilities and can't be used to boot your PC.

The parallel port Zip's casing felt a little flimsy. And as we went to press, Iomega recalled certain Jaz models (none we evaluated) because of electrical shock hazards caused by faulty power supplies. (Iomega offers replacement drives for those defective units; see www.iomega.com/sup- ▶

Sony HiFD Tease or Please?

SONY CONTINUES TO TEASE us with the availability of its 200MB HiFD drive. Indeed, after the parallel port drive's debut at CompUSA stores last November, Sony discovered some performance flaws and decided to pull its drives off the shelves.

The company then planned to relaunch the HiFD drive in April of this year, but, as we went to press, it decided to postpone shipment until sometime this fall. A company representative told us that Sony is still smoothing out some kinks.

Nevertheless, in our tests of an early production unit, the $200 parallel port Sony HiFD delivered fast performance, outpacing several EIDE, IDE, SCSI, and USB drives. And although a parallel port connection is supposed to provide less than stellar performance, the HiFD passed our AVI video playback test with flying colors, displaying smooth, full-motion video on screen.

The HiFD is worth considering if you need a portable removable-media device. As a bonus, it includes a utility that simplifies the process of moving the drive between PCs. Sony also provides around-the-clock tech support to HiFD users.

If you think you're interested in the HiFD, just ask your retailer about its availability—even if you've seen ads for it recently. If you really can't wait until fall, check out the other drives here. —Grace Aquino and Stan Miastkowski

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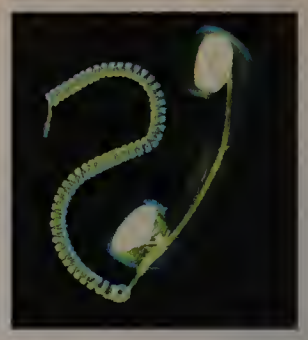
port/recalls for more information.)

Drives from Caleb, Hi-Val, and Winstation lack bundled software. In contrast, Castlewood's useful software suite includes a one-click backup utility, an image-rescue program that creates a backup on an Orb cartridge, and a bootable floppy disk that restores the backup automatically (in case of a hard disk failure). The Orb also has a tool that creates a searchable index of files stored on Orb cartridges, as well as utilities for formatting, ejecting, locking, and spinning down the drive to save energy and wear and tear.

Iomega's utilities aren't as extensive as Castlewood's. Its backup and one-step restore programs work okay, but using a Zip drive for a complete backup means you must use many cartridges. (Incremental or partial backups should be fine.) Zip drives also include a tool that makes copies of cartridges, as well as utilities for formatting, locking, and ejecting the disks. A handy audio utility can record from a microphone connected to your sound card or from other audio sources. (The audio tool doesn't come in the parallel port or internal IDE Zip versions.)

The other drives we reviewed come with few extras. Among these, the Imation SuperDisk has an accelerator utility that speeds up performance by moving tasks to the background, a trick that provides a welcome boost for this slow performer.

SERVICE, PLEASE



HOT: Hi-Val 120MB SuperDisk

NOT: None

WE CALLED EACH vendor's support line at typically busy times, such as on Monday mornings or the weekends (for those offering weekend support), and were pleasantly surprised by the knowledgeable ▶

Five Tips for Healthy Drives

TIPS AND TRICKS to help you before, during, and after you've installed your brand-new removable-media drive.

1 Maximize Printer Port Speed

To get top performance out of your parallel port drive, set its parallel port connection for maximum speed. Enter your PC's BIOS setup program (in most cases you can do this by pressing the Delete key as the PC starts up, but check your manual). Find the printer port setting (usually under the Integrated Peripherals section) and make sure it's set to EPP (Enhanced Parallel Port). Don't use ECP (Expanded Capabilities Port), especially if you've connected your printer to the removable-media drive. And don't use the molasses-like Standard Parallel Port.

2 Isolate Your Removable Media Drive From Your Hard Drive

If you're installing an internal EIDE/IDE drive, hook it up on a secondary channel, where you'll usually find your CD-ROM drive connected. It doesn't matter whether the removable drive operates as the master or slave device, but it's handiest to set the removable drive's jumper as the slave, since the CD-ROM drive will usually be the master.

Keep the hard drive to itself on the primary channel, to prevent occasions in which connecting a removable drive and hard drive to the same channel slows down the hard drive.

Then again, sometimes you have to install the removable-media drive and hard drive on the same channel (for example, when both a CD-ROM drive and a tape drive are already installed on the secondary EIDE/IDE channel). If your hard drive slows down, call the removable-drive maker's tech support. You may have to switch the drives around.

3 Keep the BIOS Current

If your PC is more than two years old, consider upgrading its BIOS. This helps avoid potential setup problems with some internal EIDE/IDE drives, and can let you boot your PC from an internal drive. (Besides, your PC may need a BIOS upgrade to be Y2K compliant.)

In some cases you can upgrade your BIOS by downloading software from your PC maker's Web site. On other systems, you'll need to replace a plug-in chip on the motherboard. Check your PC's manual or call tech support for the latest on BIOS upgrades.

4 Prioritize Your Data

What do you do when your PC has a 10GB hard drive and you want to back up data on a 100MB or 120MB disk? Frankly, it makes little sense to use low-capacity media to back up an entire hard disk. A high-capacity drive like the Castlewood Orb or Iomega Jaz would be a better option.

Use a removable-media drive to back up only critical data, and do so regularly. It helps to keep data in a couple of folders, too. That way you can drag and drop the folders onto the removable-media drive icon. You can also condense your files using a utility like WinZip or PK Unzip, but that task can take a while.

5 Save Money, Buy Media in Bulk

You wouldn't buy a single razor blade, would you? Singles carry a hefty premium. You often get the best deal if you buy media in a three-pack or, even better, a ten-pack. Face it, you'll use them. Budget carefully if you have a drive like the Iomega Jaz, whose media costs about $125 per cartridge.

Here's another advantage of having plenty of disks: You can rotate among them to be sure to avoid wear and tear on any one disk or cartridge. —Stan Miastkowski

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TCO '95 Certified	Yes	No	Yes

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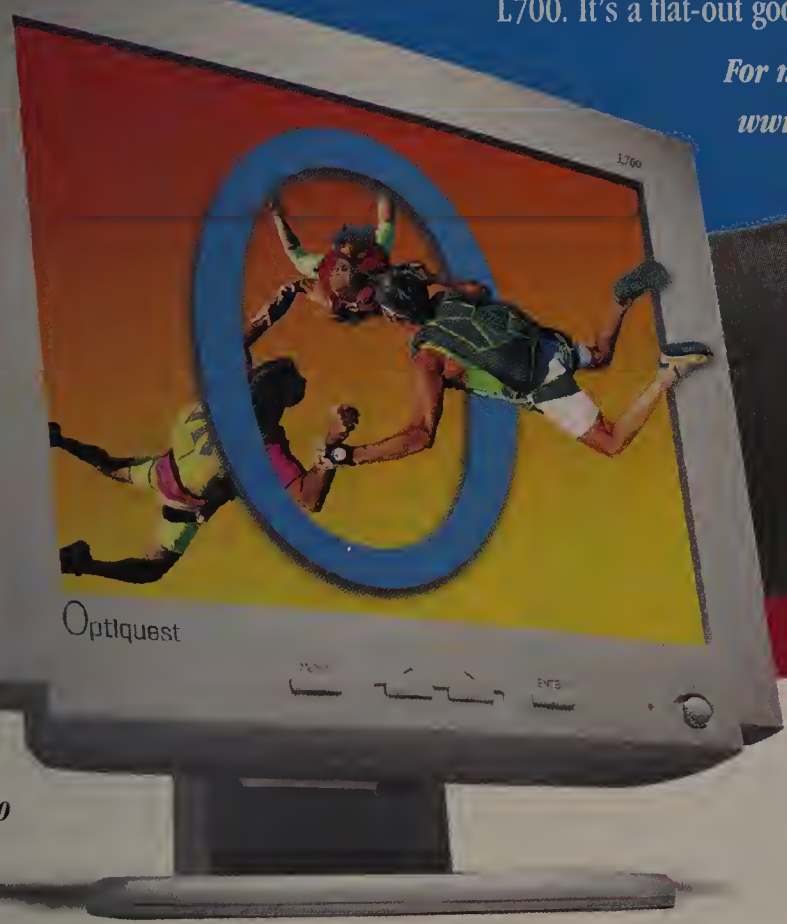

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and friendly support reps at each company.

Castlewood doesn't provide weekend support, but its reps answered the phone on the first ring. Since its drives are just becoming available, they probably weren't very busy. Hi-Val, which has 24-hour support every day, and Winstation allow you to leave a message; staffers from both returned our calls within 2 hours. All the companies here offer support via e-mail.

Besides phone support, a vendor's repair policy and service can make or break the company. Case in point: Early Zip drives broke down often, but Iomega's service efforts and replacement policy slowly improved its reputation. In a ghastly recurring problem dubbed the "Click of Death," some Zip drives produced disturbing clicking noises—sometimes followed by the destruction of data. An Iomega spokesperson stresses that all drives click and that the sound doesn't necessarily indicate a problem. If your drive does develop difficulties, Iomega's policy is to replace both the drive and any affected media at no charge. If your drive is no longer under warranty, however, you may need to pay a fee.

THESE DRIVES are compatible with standard 1.44-MB floppies. To conserve desk space, the Winstation model comes with a stand that lets it sit vertically.

DECISION TIME

WITH SO MANY different kinds of removable-media drives available, how do you know which one is right for you? Many of the drives here are affordable, easy to install, and/or provide good performance. The question then becomes, how will you use the drive? If you're interested primarily in sharing files with colleagues or friends, the Iomega Zip is the logical choice because of its ubiquity. The USB version of the Zip is a breeze to install. For more storage space, go for the 250MB Zip SCSI drive, which accepts 100MB Zip disks. If compatibility with standard 1.44MB floppies is your main concern, opt for a SuperDisk drive like the Hi-Val or Imation—or, for slightly higher capacity, the 200MB Sony HiFD drive, when it becomes available. If you need lots of space and maximum speed for storing large amounts of data—say, for full-system backups or AVI playback—then the Castlewood Orb is your best bet.

Stan Miastkowski is a contributing editor and Grace Aquino a staff editor for PC World. *Testing performed by Robert James of the PC World Test Center.* ■

Putting the Disks to the Test

YOUR REMOVABLE-MEDIA drive is only as good as the disk you put in it. And if you're like me, you put that disk through serious abuse: dropping it, tossing it into a briefcase, leaving it in a car on scorching summer days. So we ran stress tests on all the media used by the drives here. Only the 2GB Iomega Jaz cartridge passed every test impeccably.

We dropped all disks three times from desk height onto a carpeted floor. Then we froze each disk in a plastic bag to simulate leaving it in a car on a cold night. Finally we raised the temperature of a heat lamp to 135 degrees and left the disks underneath it overnight.

To sum up the results in seven words: Cold good, heat bad, dropping not recommended.

All of the disks passed the cold test, but only Castlewood's Orb and Iomega's Jaz endured excessive heat. All floppy disk-like media—Caleb's UHD144, Imation's SuperDisk, and Sony's HiFD—warped so badly after the heat test that they would no longer fit in their drives. The adequately armored Zip cartridges didn't warp, but we couldn't read data off them. The Orb was the only disk affected by the drop tests; afterward it displayed a few read errors. That explains the printed warning: "Do not drop."

Bottom line: Treat your media with respect. Be sure to use a protective holder to provide shock protection and keep it clean and away from heat. —Stan Miastkowski

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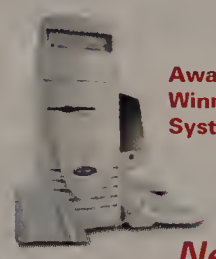

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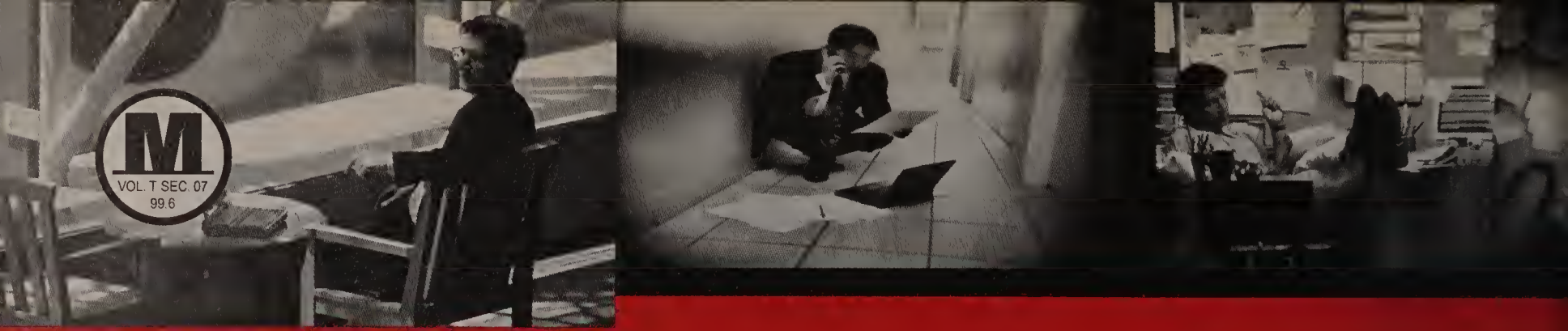

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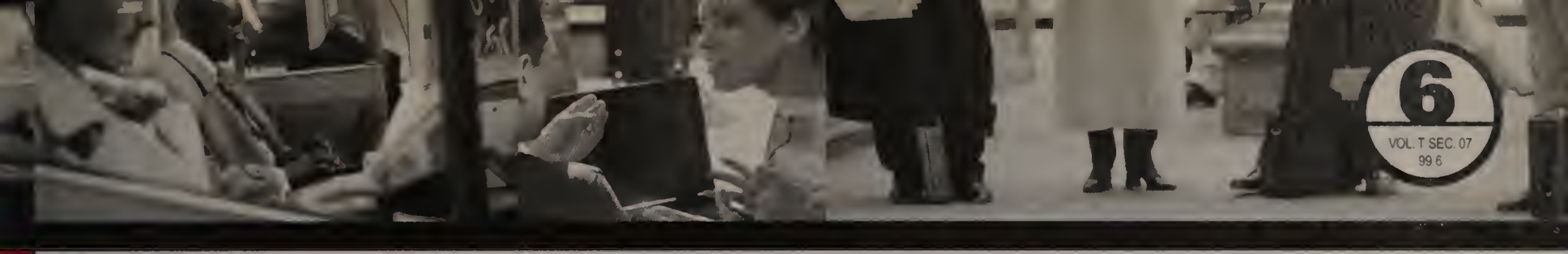

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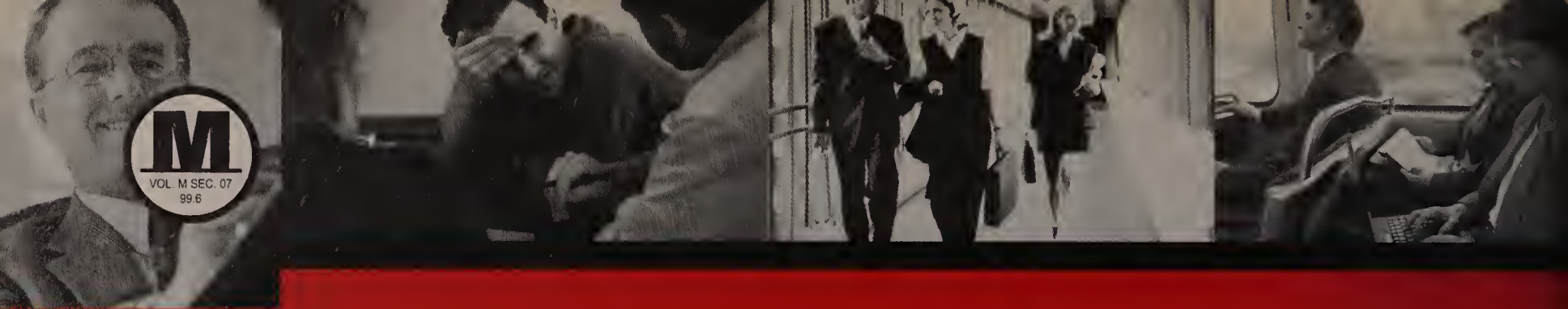

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MICRON U

Model Name	Millennia® C400	Millennia C433	Millennia C433
Processor	Intel Celeron processor 400MHz	Intel Celeron processor 433MHz	Intel Celeron processor 433MHz
RAM	64MB SDRAM	64MB SDRAM	128MB SDRAM
Hard Drive	8.4GB Ultra ATA hard drive*	13GB Ultra ATA hard drive*	13GB Ultra ATA hard drive*
Monitor	17" Micron 700Cx monitor (15.9" display)	17" Micron 700Cx monitor (15.9" display)	17" Micron 700Cx monitor (15.9" display)
DVD/CD-ROM	40X CD-ROM drive°	40X CD-ROM drive°	4.8X DVD-ROM drive
Modem	3Com USRobotics V.90 WinModem**	3Com USRobotics V.90 WinModem**	3Com USRobotics V.90 WinModem**
Graphics	8MB nVidia Riva 128ZX AGP 2X graphics	8MB nVidia Riva 128ZX AGP 2X graphics	8MB nVidia Riva 128ZX AGP 2X graphics
Micron U	1-year free[Δ] training @ Micron U online	1-year free[Δ] training @ Micron U online	1-year free[Δ] training @ Micron U online
Onsite Warranty	3-year on-site Warranty	3-year on-site Warranty	3-year on-site Warranty
Operating System	Microsoft Windows 98	Microsoft Windows 98	Microsoft Windows 98
MConnect	Micron pays for 1 year EarthLink Total Access	Micron pays for 1 year EarthLink Total Access	Micron pays for 1 year EarthLink Total Access
Factory Direct Price	$42/mo.[‡] $1,399 Business Lease 48 mos.**	$45/mo.[‡] $1,499 Business Lease 48 mos.**	$51/mo.[‡] $1,699 Business Lease 48 mos.**

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BY MATT LAKE AND DYLAN TWENEY

...IN WHICH OUR VALIANT SURFERS INTERNET TO SEEK THE ULTIMATE

ILLUSTRATIONS BY RICHARD DOWNS

AND IT CAME TO PASS *that the knights began their quest for the Grail. To traverse the length and breadth of the land was a perilous undertaking, yet they had no choice. So with great diligence and courtesy they began to sift through every field, fortress, and farmyard...*

Needles? Haystacks? Nay, sirrah. Searching the Web makes winnowing straw in search of a bodkin child's play by comparison. The glittering skein holds so much information—and misinformation—that nothing short of an heroic quest will enable you to find the silver chalice you seek in the ocean of digital Dixie Cups. Verily, we'd as lief search for the Holy Grail by picking pages at random from the medieval books section of Ye Olde Barnes and Noble as seek information on the Net by blind errantry in the murky depths of an unknown Web search site.

The information is out there, right enough, but you have to wade through a lot of shining armor, drama, and sorcery just to get to it. That's where we come in—consider us the Merlin to your gallant Arthur. We'll avail you of strategies to reduce your searching times, summon the most from the search engines you already know, and wield indispensable—and often overlooked—search tools.

So if you be pure of heart, pray you saddle up, and with a shrewd *PC World* squiring by your side, mount a quest. ▶

JOURNEY TO THE ENDS OF THE SEARCH TOOLS...AND PREVAIL.

GENERAL SEARCHES

YOUR QUEST SHOULD BEGIN with general search tools such as those offered by AltaVista, Dogpile, Excite, GoTo.com, HotBot, InfoSeek, Lycos, and Yahoo. These sites—Yahoo in particular—are the best places to conduct searches on general topics.

◆ **AltaVista (www.altavista.com)** ◆ A powerful general-purpose search engine, Compaq's AltaVista has been around longer than most other search sites on the Web. Though it lacks some of the query-construction niceties of other sites, such as drop-down boxes for building Boolean expressions, it offers a few unique tools. One useful feature lets you type simple questions into the query box; then, along with providing the search results, AltaVista will guess at several related questions you might want answered. For instance, a search on "dog" netted us "How are hot dogs made?" and an Answer button that linked to pertinent sites.

AltaVista's basic search form lets you specify in which of 25 languages—not Old English, alas, but how about Icelandic or Lithuanian?—you'd like your search results to appear, a nice feature that other sites generally include only on their advanced search forms. And check out the Tools and Gadgets page (www.altavista.com/av/content/tools) for such handy accessories as the Stress-O-Meter, the Calorie Calculator, and Find Polluters Near You. Of special interest is the Babelfish tool (babelfish.altavista.com), which lets you translate phrases or entire Web pages to and from English, French, Italian, Spanish, and other languages.

TIP To search a specific site, type **host:*domain keyword***. For example, if you're looking for CNN's coverage of Bosnia, type **host:cnn.com bosnia**. For info from a specific country, type **domain:*country keyword***. For example, **domain:uk football** will take you to British sites dedicated to soccer.

◆ **Dogpile (www.dogpile.com)** ◆ When one search engine's index doesn't yield all the data you're looking for, metasearch sites such as Dogpile come into their own. Metasearching is the online equivalent of sending a whole round tableful of knights out to bring back results from the four corners of the Web. Many sites perform metasearches, but Dogpile puts a different spin on this trick. For one thing, it metasearches different types of sites: You can choose from among searches of the Web, newswire services, Usenet, FTP sites, and other sources such as maps, weather reports, and stock quotes.

YE OLDE SEARCH TIPS

A knight wouldn't embark on a quest without first knowing how to ride a horse. It's much the same when the steed in question is a search engine. Fortunately, a few tricks will help you hone your queries and speed more quickly to the results you seek.

ENTER PHRASES OR QUESTIONS You'll get better results if you enter a few related words rather than a single word. Thus, *King Arthur Holy Grail* will be more effective than simply *Arthur*. You may also enter a question: *Who found the Holy Grail?* Most search engines ignore words like *the* anyway.

CHOOSE YOUR WORDS WISELY A generic search phrase like *round table* will yield too many results if you're trying to find out about Arthur's famous furniture. A better phrase: *king arthur knights round table.*

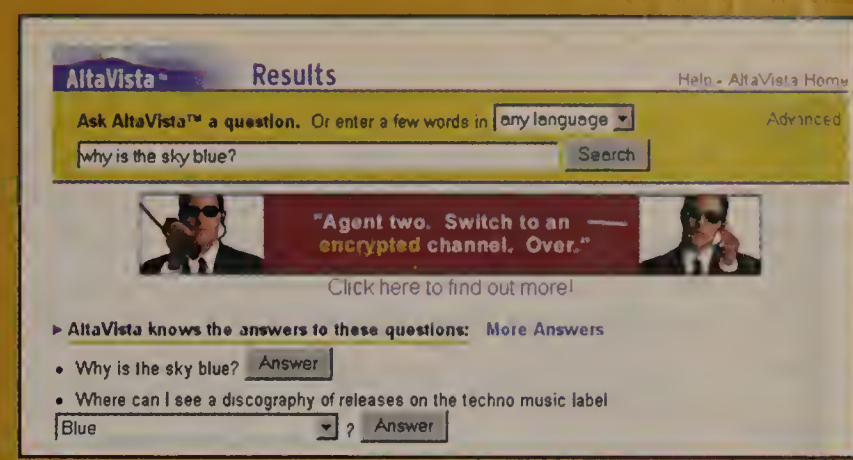
TRY AND TRY AGAIN If you don't glean what you're looking for on the first try, don't give up. Try varying the original query by substituting synonyms or related words. Too many results? Add descriptive terms to make your query more precise.

PUT QUOTES ON KEY PHRASES Put quotation marks around specific, verbatim phrases that you want to find exactly as written: *"To be or not to be."*

GET HELP FROM OPERATORS Common tools for linking search words together include the Boolean operators *AND*, *OR*, and *NOT*, and the + and − signs. These operators, recognized by most search engines, help you craft more clearly delineated queries. *AND* links words that must be contained in each returned result: *Arthur AND Merlin*. If only one of the two words must be found in the results, use *OR*: *Merlin OR Merlyn*. *NOT* or the minus sign, inserted before a word, can be used to exclude words that must not appear in the results: *Holy Grail −Monty −Python*. The plus sign used before a word indicates that the word must appear in the search results: *+King +Arthur*.

The results aren't collated. Instead, they're served up in groups arranged by the search engine that found the information. This isn't the handiest way to sort through information (the software Copernic 99 does it better; see "The Magic Toolbox," page 174), but it's very fast. And the site provides searches of news and news releases under its BizNews section, sensibly sorted by date.

TIP Use lots of Boolean terms in a Dogpile search. Putting phrases in quotes or using a minus sign to exclude a word can make all the difference when results from different search engines aren't sorted for duplicates.



▶ **WHEN YOU type a query in AltaVista, you may receive an answer from a highly relevant site in addition to query results.**

◆ Excite (www.excite.com)◆ A single Excite search provides all kinds of results—not just Web page links. Search for, say, the Rolling Stones, and you'll get news stories, schedules of events, encyclopedia articles, and sound clips. When you search for a publicly traded company, the first results you'll see are links to its financials and to the company's Web site. For a quick overview of a subject, it's hard to beat these categorized results. Excite also has handy tools for making adjustments when the first search yields few relevant results. By simply clicking a button, you can change the sort order so that the output is listed by Web site. If only one result seems relevant, click the words *More Like This* beneath it, and Excite will re-search the Web based on the words and concepts in that result.

TIP If your search yields lots of irrelevant items, pick out a few key words from the "Select words to add to your search" list below the search form on the results box.

◆ HotBot (www.hotbot.com) ◆ This site is great at locating Web pages posted during a specific period of time. The basic search form's excellent controls, in ▶

THE BEST FOR YOUR QUEST

SITE	Best use
AltaVista www.altavista.com	Multilingual searches, queries entered as simple questions
AnyWho www.anywho.com	Finding current telephone numbers
Ask Jeeves* www.ask.com	Natural-language queries
Britannica Online $ www.eb.com	Scholarly or authoritative research
BugNet* $ www.bugnet.com	Tracking down software bugs
CompanySleuth www.companysleuth.com	Getting information about companies you do business with or invest in
CompareNet www.compare.net	Comparison shopping and preshopping research
Deja News www.dejanews.com	Locating useful information in Usenet communities
Dialog Web $ www.dialogweb.com	Accessing professional publications and business databases—at a cost
Dogpile www.dogpile.com	Online metasearching of the Web, Usenet, and news sources
Dow Jones Interactive $ www.djnr.com	Accessing databases of proprietary information not available on the Web
Electric Library $ www.elibrary.com	Research across a wide range of publications
Encarta encarta.msn.com	Basic encyclopedia research
Excite www.excite.com	Broad searches of the Web
Google* www.google.com	Getting up-to-date results quickly
GoTo.com* www.goto.com	Searching for commercial sites
Hoover's Online $ www.hoovers.com	Researching companies
HotBot www.hotbot.com	Advanced, time-sensitive searches

SITE	Best use
InfoSeek infoseek.go.com	Filtering adult content
KnowX $ www.knowx.com	Searching public records of businesses and individuals
Lexis-Nexis $ www.lexis-nexis.com	Searching professional databases and articles not open to the Web
Lycos www.lycos.com	Finding graphics, music files, and other specialized content
Microsoft Network www.msn.com	Searching with multiple engines
Microsoft's KnowledgeBase support.microsoft.com	Troubleshooting Microsoft products
The Motley Fool www.fool.com	Financial information and stock tips
MySimon* www.mysimon.com	Detailed comparison shopping
NetCenter www.netcenter.com	Accessing various search engines
NetLibrary* www.netlibrary.com	Finding and downloading e-books
Northern Light $ www.nlsearch.com	Combined searches of Web sites and pay-per-view articles
No Wonder www.nowonder.com	Technical support for various software
OneLook www.onelook.com	Dictionary definitions, links to journal abstracts
SupportHelp.com www.supporthelp.com	Finding tech support sites and phone numbers for high-tech companies
Switchboard www.switchboard.com	Finding phone numbers, e-mail addresses, and neighborhood attractions
TotalNews www.totalnews.com	Locating newspaper and TV news sites
WebMarket www.webmarket.com	Combing through online product catalogs
Yahoo www.yahoo.com	Narrowing search results category before you begin searching

$ = Charges for some or all services. * For more information, visit PC World Online at www.pcworld.com/jun99/websearch.

drop-down list boxes, cover a lot of ground. You can search for phrases, page titles, people, and links to a particular URL, and restrict results to any of nine languages. Keen on finding the very latest? Prefer a more generous time frame? Narrow the results to pages updated within the week, or broaden the period to several months. And you're not restricted to seeking Web pages: Check boxes let you search for JavaScripts, images, audio files, and video files.

HotBot's advanced search form spells out a few of the Boolean options you can type into the regular form, and adds some new options such as restricting a search to a particular domain (like pcworld.com) or top-level domain (such as .com, .gov, or .edu). This is useful for scouring sites that lack a good search tool. And if HotBot fails to get results (as it did in a few of our quests), there's a button that reissues the search on Lycos.

TIP Don't create too long a Boolean string to narrow a search. After two or three *NOT* statements, HotBot throws up its hands and gives zero results, even when hundreds of sites actually satisfy the specified query.

◆ **InfoSeek (infoseek.go.com)** ◆ InfoSeek is the search engine component of the Go Network, an array of Web content sites affiliated with Disney and ABC. Like other search sites, InfoSeek uses a simple one-box search form: Just type your query and hit **<Enter>** or click the *Search* button. Use the drop-down box to specify whether you want to search for Web pages, news stories, newsgroup messages, or companies. Like HotBot and Lycos, InfoSeek has an advanced search form for constructing Boolean queries or searches by category. There's also a handy filter you can use to screen out content unsuitable for children; it's called GoGuardian and can be turned on with a single click.

TIP Use the pipe character (|) to search within subject categories on InfoSeek. For example, type **dance|tango** to search for the word *tango* within the category *dance*.

◆ **Lycos (www.lycos.com)** ◆ An attractive, convenient search site, Lycos combines news, product offers, and other consumer niceties with its Web page search results. Its context-sensitive search bar lets you refine searches with ease: Once you've entered an initial search, Lycos lets you run a second query on the first set of results, or within a Lycos category such as Weather or sites that have won the Top 5% award.

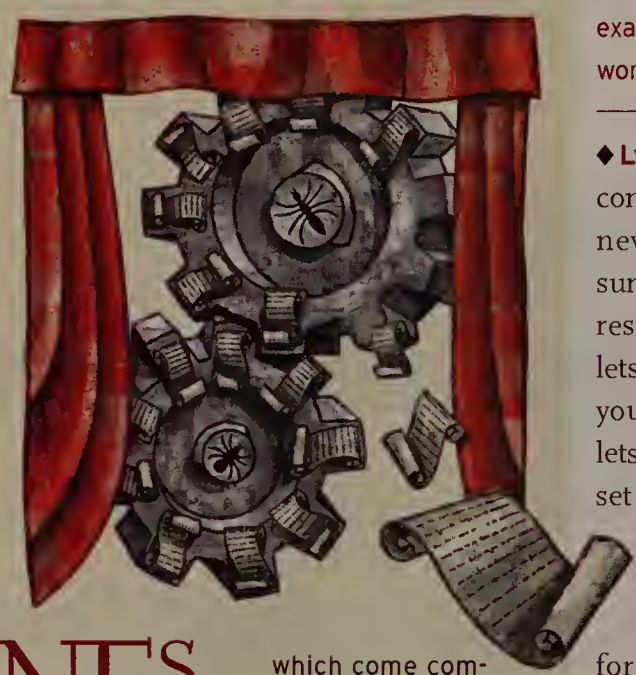
Lycos's Pro Search page lets you look for specific content, such as images, MP3 files, books, or newsgroups.

TIP Search Guard is an optional service that screens out content such as pornography and possibly objectionable language; using it can limit your access to chat rooms and bulletin boards through Lycos. Once you register for Search Guard, you can specify the content you want to screen out.

◆ **Microsoft Network (www.msn.com)** ◆ Like its browser-war opponent Netscape, Microsoft maintains a search site in which it bestows regal favor on other Web search sites that pledge their fealty to the kingdom—in this case, AltaVista, Infoseek, Lycos, and Snap. The Microsoft Network search site (search.msn.com) also provides a proprietary MSN search, capable of handling mixed phrase and operator searches (like **"King Arthur" -Guinevere** for citations of the king

SEARCH ENGINES DEMYSTIFIED

It's not as mystical as casting runes, but what goes on betwixt clicking the Search button and scrolling a results page might as well be magic. All search tools use a three-stage process to compile your results page: generating an index, searching the index, and sorting the results. But each site handles these tasks differently and can thus yield different results.



YAHOO'S SUPERIOR INDEXING Most search engines use "spider" software that crawls over the Web to create an index. The software targets various sites and follows all the links on every page there, indexing each page. Indexes vary in quality, depending on how frequently they're updated and how often pages deleted from sites are deleted from them. The results also vary in relevance, because spider indexing may include invisible descriptions (known as metatags) added by Webmasters, titles and headlines, and key words and phrases from the page.

All these factors can produce misleading results, especially since many Webmasters abuse them to drive traffic to their sites. The result? Irrelevant hits. That's why Yahoo's much-imitated model of human-generated site descriptions, which come complete with search-friendly keywords, often yields more-relevant results.

SORTING RESULTS When you enter search words in a form, the search engine begins to search its database. The query results then get sorted, another source of big differences between search engines.

Most sites that have invested in human site-indexing put those results ahead of mechanically indexed ones. GoTo introduces paid-for results into the mix, if an advertiser has bought placement for specific search words such as *travel* or *music*.

The bottom line: For the most thorough results, use more than one engine or go straight to a metasearcher like Dogpile. And for narrower, more optimized results, you can't go wrong with Yahoo.

without his consort). And www.msn.com provides an all-in-one page that includes more search options, from Web-wide searches at GoTo.com and Northern Light to specialty searches of Corbis's art collection or of Dictionary.com. Internet Explorer 5.0 users who follow the More Searches link find more than a long list of search sites. For them, the page provides the chance to customize what appears when they click their browser's Search button—including the option of adding their own favorite search sites.

◆ **NetCenter (www.netcenter.com)** ◆ Netscape's NetCenter collects half a dozen different Web search sites under a single URL—seven sites if you count Netscape's branded version of Excite as a separate entity. Certainly, it can be beneficial to have access to Excite, InfoSeek, Lycos, Snap, and LookSmart—plus a news search called NewsTracker (also from Excite).

TIP If you know which sites you like to search, go directly to them and avoid getting mired in NetCenter's interface.

◆ **Yahoo (www.yahoo.com)** ◆ Aside from being a top-notch search engine and the most popular portal on the Web, Yahoo is a carefully constructed, laboriously maintained subject catalog of the Web. This makes it an ideal instrument for your first search. Rather than zeroing in on specific pages within a site, Yahoo lets you locate entire sites and their index pages. This tactic is especially useful when you're interested in finding a certain page but don't know exactly what you're looking for within it. Because Yahoo enables you to search by categories or by sites, its results tend to be more manageable than those from other search sites.

TIP Be sure to take advantage of Yahoo's well-organized categories to narrow down your search. First browse to the general category you're interested in, and then enter a query and specify that Yahoo should limit its search to *just this category.*

SPeCIFIC SeARchES

IF YOU'RE ON the trail of a specific type of information, a general search at a site like Yahoo or AltaVista may not be the best stratagem. Instead, you might want to decamp to a site with a special focus, such as discussion groups, personal information, news, company data, published articles, tech support, or products. Choose wisely, and you'll find the task easier than pulling a sword from a Styrofoam stone.

Companies/Organizations

AND ARTHUR *welcomed Mordred to Camelot, and accorded him much respect. But Mordred conspired with the sorceress Morgan LeFay to overthrow the king and usurp the throne...*

King Arthur learned by bitter experience whom he could trust and whom he could not. If you want to know which companies, clients, and customers you can rely on, you need to know a little more than the comeliness of their visage. And the Web is a veritable dragon's hoard of such information.

For quick lay-of-the-land data on a public company, try entering its name at Excite. The site will provide a company address and links to the corporate Web site and to stock figures—and it will throw in links to news stories about the company, if any show up.

One of the easiest ways to track public companies is to register—for free—at **CompanySleuth (www.companysleuth.com)**. You'll get daily updates of all news, stock performance, and postings on investor bulletin boards. While not a search site in the orthodox sense, CompanySleuth does root out information and publish it on a personalized page.

◀ **FOR INFORMATION on businesses, including figures and concise descriptions, Hoover's fills the vacuum.**

▼ **FEEL LIKE you're being watched? CompanySleuth tracks who's requested info about your company.**

List of companies watching **AMD**:

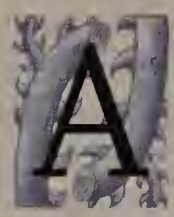
1. **Intel Corporation (INTC)** (34 users)
2. **Compaq Computer Corp. (CPQ)** (15 users)
3. **IBM (IBM)** (12 users)
4. **Dell Computer Corporation (DELL)** (9 users)
5. **Cirrus Logic, Inc. (CRUS)** (7 users)
6. **Infonautics, Inc. (INFO)** (7 users)
7. **3Dfx Interactive, Inc. (TDFX)** (6 users)
8. **America Online Inc. (AOL)** (6 users)
9. **BankAmerica Corp. (BAC)** (5 users)
10. **Lockheed Martin Corp. (LMT)** (5 users)

TIP If you're keen on tracking companies you're investing in or competing with, get CompanySleuth to e-mail you a daily update that lists the new material on each page. The updates come out even on weekdays and holidays, and they provide live links to the pages for each company you're tracking. ▶

For free information about public and private companies and their officers, try **Hoover's Online (www.hoovers.com)**. You can learn a company's size, location, financial details, history, and principal officers by entering its name or ticker. The compact results screen includes links to the firm's competition, subsidiaries, stock charts, and position on the Fortune, S&P, and Hoover's top 500 lists. If that's not enough, you also get links to news stories, press releases, and key areas on company Web sites. For access to Hoover's company profiles—which add even juicier tidbits such as chief officers' salaries—you'll have to pay a $15 monthly fee.

Many small companies, however, fall outside Hoover's scope. To get much information on those, you may need to address public records, which include a wealth of legal details. **KnowX (www.knowx.com)** is an excellent source of public records—though you may have to pawn the crown jewels to get all the information you're looking for. KnowX can disinter any history of lawsuits and bankruptcies from its public-record sources. Need to know the principals of a company, whether they're licensed to practice their trade in your state, or whether they do business under any other names? Find the bodies here.

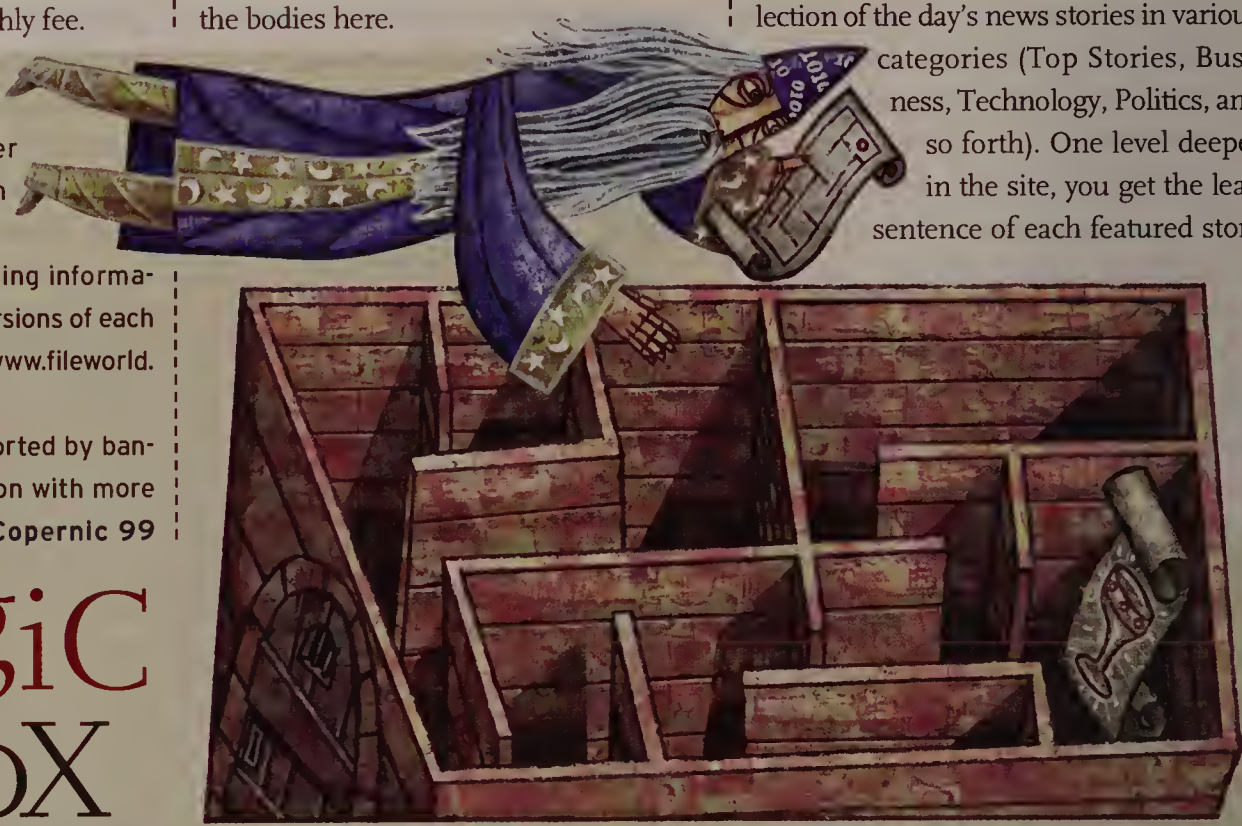
News Stories



AS THE KNIGHTS *sat down, each in his place about the Round Table, and the great repast began, a minstrel sang ballads telling of intrigue and mayhem in a land not far away.*

The Knights of the Round Table had to rely on wandering minstrels for news, whereas we—less poetically but more usefully—have the Internet. Our only problem is choosing the best source.

Yahoo News (dailynews.yahoo.com) provides a well-organized, easy-to-browse collection of the day's news stories in various categories (Top Stories, Business, Technology, Politics, and so forth). One level deeper in the site, you get the lead sentence of each featured story



THE MAGIC TOOLBOX

Several downloadable programs offer the weary pilgrim further options for finding and organizing information. You'll find free or trial versions of each of the following programs at www.fileworld.com/magazine.

A free metasearcher supported by banner advertising (a $30 version with more options is also available), **Copernic 99 (www.copernic.com)** taps 11 popular search engines and lets you save whole pages from the results for offline browsing. Among Copernic's conveniences is a tool for saving your search terms so you can continue to research a topic. Unlike most metasearchers, Copernic also narrows searches with ease: It lets you exclude results either by using Boolean arguments or by clicking a box next to the result and hitting <Delete>.

Serious Net searchers in need of high-powered research assistance should check out Prompt Software's **SuperSleuth (www.promptsoftware.com, $60)**, which can deliver your queries to dozens of search engines simultaneously. It then compiles the results, and analyzes and indexes every page returned. Needless to say, it's a time-consuming process. And SuperSleuth's daunting interface ensures that you'll need some time to maximize results. You can try WebSleuth, SuperSleuth's poorer cousin, for free, but if you need to scour the Net till it shines, you'll probably want SuperSleuth.

Webforia Organizer (www.webforia.com, $79) can act as a Web browser and a search tool, but its greatest strength lies in letting you further index specific sites and store the results offline for later searching. Clicking Organizer's bookmark tool as you browse prompts it to save not only a site's URL and page title but also an index of keywords for subsequent offline review.

If you're an information junkie with an overflowing in-box and a pile of Web research jobs waiting, **Enfish Tracker Pro (www.enfish.com, $80)** may be just the program to get you organized. Enfish aims not simply to manage your Internet searches, but to organize your entire life—at least the part of it that passes through your PC. When you install Enfish, it first indexes everything on your hard drive—a process that may take several hours. Once this process is complete, Enfish sits in the background, quietly monitoring and indexing everything you do—documents you write in your word processor, e-mail you send and receive, and Web pages you browse. It groups related data together, making it easier for you to retrieve information later.

The freeware **Alexa (www.alexa.com)** suggests additional sites for you to visit when you're browsing. Visible on your desktop as a narrow toolbar that sits off to one side, Alexa displays a list of links related to the site you're currently visiting.

along with its headline, for quick scanning. News sources include Reuters, AP, and ABC news wires; and a "photo gallery" collects news photos. You can access news from the previous ten days through links at the bottom of the page.

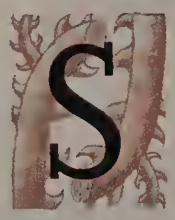
TIP To filter the day's news automatically, create your own customized news page using My Yahoo (my.yahoo.com).

The news page that's run by **HotBot (headlines.hotbot.com)** dispenses with the packaging and cuts to the chase with a no-nonsense news search engine. This is the site to use if you want to find everything pertaining to a current topic, rather than catch up with the day's events (Yahoo's specialty). HotBot searches such news sources as the Washington Post, the Los Angeles Times, wire services, Wired News (for technology coverage), CNN, ESPN, and several other special-interest news providers.

Other search engines also offer news services. **Lycos (news.lycos.com)**, **Go Network (www.go.com/Center/News)**, and **Excite (nt.excite.com)**, for example, all provide searchable and customizable news pages similar to Yahoo's. Since the content they contain is more or less the same (mostly AP and Reuters newswire stories), the one you'll find the most useful is largely a matter of personal preference.

For links to all the news you can possibly read, take a look at **TotalNews (www.totalnews.com)**, which maintains a comprehensive list of dozens of general- and special-interest news sites. TotalNews doesn't publish any stories or let you search through them—it's just a one-stop news site that serves up a customizable page with links to major news sites such as the New York Times, Wall Street Journal Interactive, and the San Jose Mercury News, along with some smaller-circulation and international sites.

Peer-to-Peer Discussion Groups



SIR LANCELOT *fared forth among the common people, for he fain would discover the wisdom that rumour swore dwelt in their midst. But he found there naught save halfwits and fanatics, mumbling nonsense and shouting anon in anger. Then did he despair, for he saw plainly that he tarried in the land of Usenet.*

Usenet has been around far longer than the Web, and its thousands of discussion groups harbor a wealth of collective wisdom, as well as a lot of nonsense. If you seek wisdom among the Internet's many discussion groups and forums, you need a keen blade to cut through the chaff and chatter.

What Excalibur was to King Arthur, **Deja News (www.dejanews.com)** is to the Usenet searcher. Interested in the latest chain-mail armor? Search Deja News and see what people are saying about it. Not only does Deja News give you powerful tools for searching Usenet, it lets you browse postings and even post some of your own—all through your browser.

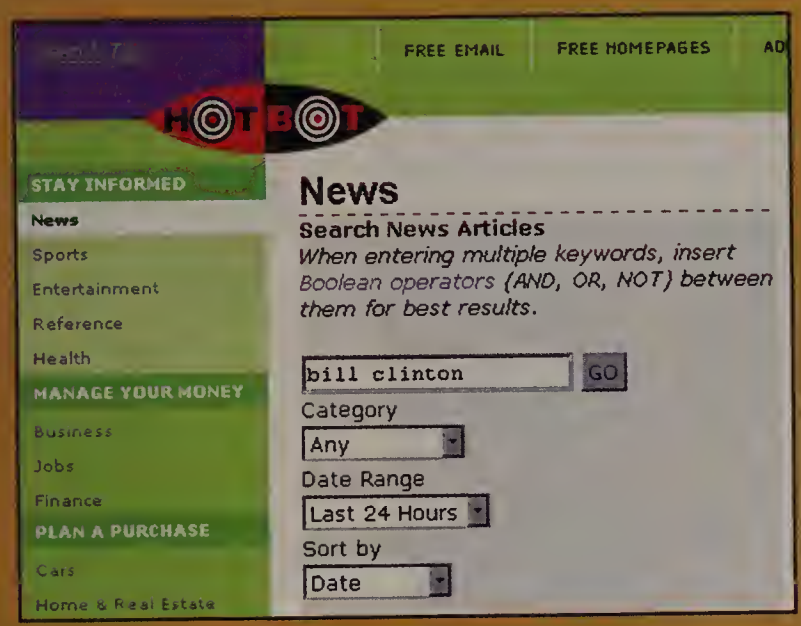
If you're desirous of increasing the number of gold pieces in your purse, consider joining a discussion forum dedicated to financial and investing matters. Two excellent sources of information are **Yahoo Finance (quote.yahoo.com)** and **The Motley Fool (www.fool.com)**. Just remember that those who proffer investment advice are not always the most chivalrous of guides. Keep your wits about you as you peruse the information displayed in these and other Web discussion boards.

Personal Information

AT A CROSSING *in the wood, Sir Kay found his path barred by a dark knight astride a fearsome black steed. Without a word, the stranger lowered his lance and, at a gallop, neatly unseated Sir Kay. As the knight rode off, Kay bethought himself who had smote him so discourteously.*

So you're looking for the black knight who knocked you off your horse? With a little patience and some Net servers, you can find just about anyone.

The most effective and up-to-date database of telephone information is **AnyWho (www.anywho.com)**, a searchable nationwide telephone book from AT&T. It contains white-pages listings for individuals; business listings; a ▶



▲ A SEARCH form on HotBot's news page lets you hunt for topics in recent news stories from an array of sources.

◀ A POWERFUL tool for finding useful content in Usenet, Deja News also provides its own Web-based communities.

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Introducing the newest addition to the Silicon Graphics® visual workstation family. The operating system is Windows NT.® And the computer is pure Silicon Graphics. Featuring our Integrated Visual Computing (IVC) architecture with the Cobalt™ graphics chipset, these breakthrough machines move graphics data six times faster than AGP 2X-based workstations*—a massive 3.2GB per second. What's more, our IVC architecture integrates 10/100 Ethernet, IEEE-1394,† USB and professional video I/O for a blistering 12-fold increase in bandwidth over other PC workstations.** Finally, you can get the outrageous 2D, 3D and digital media performance you expect from SGI—for about the price of a mere clone. The Silicon Graphics 320™ workstation with the Intel® Pentium® III processor starts at just $3,695. Or choose the Silicon Graphics 540™ workstation.†† Supporting up to four Intel® Pentium® III Xeon™ processors, it's the most scalable Windows NT workstation around. Either way, your computer will scream. And so will you.

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- *Microsoft® Windows NT® Workstation 4.0*
- *Scalable up to 1GB ECC SDRAM*
- *Add the SuperWide™ 17.3" Silicon Graphics 1600SW™ digital flat panel monitor (shown) for only $2,494*

*Bandwidth based on graphics to main memory. †Requires additional software under Windows NT Workstation 4.0. **I/O bandwidth as compared to 32-bit PCI. ††For information on the 1999 availability of the Silicon Graphics 540 workstation, please call 1 888 SGI-4291. Prices quoted are for U.S. only. All prices subject to change.

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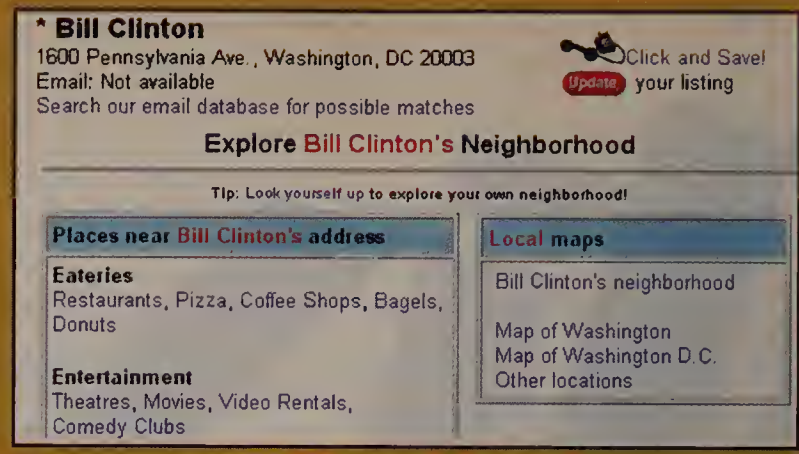
"reverse" phone number lookup (supplying the name of the person listed for any telephone number you enter); and a Web page directory.

If e-mail addresses are the quarry you pursue, try **Yahoo People Search (www.people.yahoo.com)** and **Lycos's WhoWhere People Finder (www.whowhere.lycos.com)**. Both sites let you search for e-mail addresses or telephone numbers by name. One warning: Because many people change their e-mail addresses frequently, these databases tend to be rife with anachronistic addresses. Check several directories when in doubt.

TIP If you know the city or state the person you're seeking lives in, or the domain he or she uses (the part of the e-mail address following @), you'll have much better luck finding the right address—especially if you're trying to hook up with your old college roommate John Smith.

▶ **SERFS AND TURFS: AT&T's AnyWho site is a national directory of phone numbers and addresses.**

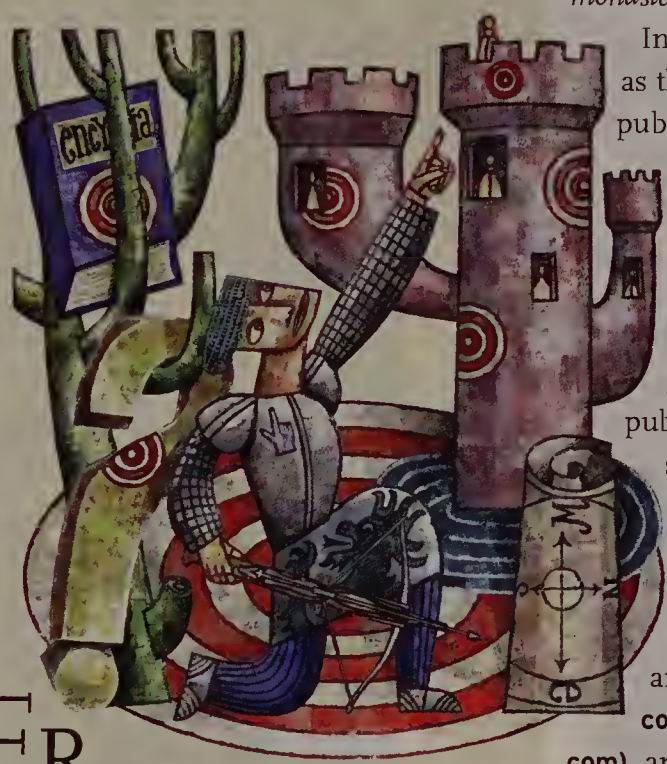


Switchboard (www.switchboard.com) offers the same phone and e-mail searching as the above sites. But once you find a person's listing, Switchboard lets you look up attractions in their neighborhood, along with other local information.

YOUR BROWSER AS A SEARCH TOOL

Before your quest takes you to all corners of the Web, try the search tools in your favorite browser. Both Internet Explorer 5 and Navigator 4.5 have features that can reduce typing and navigation time and may save you a long trip to unfamiliar realms.

INTERNET EXPLORER 5 When you click the Search button, a left-hand pane opens, listing several search options: Find a Web Page, Find a Person, Find a Map, Find in Encyclopedia, and more. To configure these options to your liking, click *Customize*, which will take you to a Web page where you can specify your preferred search sites and the order in which the Search tool should query them. Type a keyword into the search field, and the query will be issued to all the participating search engines. When results appear in the search pane, you can click a link, and its page will appear in the main browser pane. If you don't find what you're looking for, click *Next* in the left pane, and you'll see the results from the next participating search engine (AltaVista, HotBot, and others). For even faster searches, type a question mark in the address box, immediately followed by your query: for example, **?king arthur**.



NAVIGATOR 4.5 While you're perusing a site, you may want to read more about the topic currently at hand. Navigator 4.5's 'What's related' menu offers links to subjects similar to the one you're currently browsing. When you visit ESPN.com, for instance, this menu will list other sports-related sites. Sound familiar? This feature is Netscape's own revamped version of Alexa (see "The Magic Toolbox," page 174).

As in IE 5, you can also type a question mark into the address bar, immediately followed by your query. —Yael Li-Ron

Published Articles

THE LADY of Shalott read all that she could, but perforce when her books were exhausted, she yearned the more avidly for further knowledge. Alas, such wisdom was kept from her, cloistered within the walls of the monasteries, whence it had no egress.

Information may want to be free, as the homily assures us, but many publishers of information have no wish to give it away. And Web-based advertising doesn't cover the cost that some wish to charge for the information. While you can find a lot of information gratis, you'll have to cross the publishing companies' palms with silver to get articles from professional journals or a wealth of other proprietary information.

Premium sources of pay-per-view information on the Web are **Dialog Web (www.dialogweb.com)**, **Lexis-Nexis (www.lexis-nexis.com)**, and **Dow Jones Interactive (www.djnr.com)**, all of which started as information aggregators in the 1970s and 1980s, before the Web existed. Each offers a number of subscription services over the Web, focused on databases relevant to general business audiences, and legal and other professions. But beware: They hit you up for money often—for the subscription, for connection time to proprietary databases, and again every time you view an article. Dialog Web even charges for "DialUnits," its name for each term or operator you use in a query. The fees for these sites can sting, too. The subscriptions can be as low as $69 a year (for Dow Jones Interactive), but most articles can run $3 apiece. ▶

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They merit the investment if time and accuracy are crucial to you. Otherwise, consider other Web-based sellers of published material first.

TIP Many databases accessed by Dialog, Lexis-Nexis, and Dow Jones Interactive charge connection-time and per-article fees. To avoid unpleasant surprises, find and print rate sheets before you search.

Inhabiting the middle ground between Web freedom and access to premium publications, **Electric Library (www.library.com)** charges a $10 monthly fee (or $60 for a full year) but provides unlimited access to articles without levying any extra charges. **Northern Light (www.nlsearch.com)** takes a different approach: It's a general Web search site that also gives you access to premium information such as articles from periodicals that can't be found on the Web. And Northern Light integrates these results with regular Web searches, so if you don't find the information free, you don't need to rekey a search term. Be cautious about which special collection items you purchase, though. With some, you're paying not for the information, but for the convenience of metasearching a category: The $1 PR Newswire press releases, for example, are available free at www.prnewswire.com. (Note, however, that they're available for only the past 30 days.)

Reference Works

MERLIN REVEALED *to Arthur where he might find the one whom destiny intended to save the kingdom and find the Grail. Thus apprised, the king summoned the lord of that castle. But he who came forth was not blameless Sir Galahad but the profane father of the same.*

When you skimp on background research, you risk making glaring mistakes and opening yourself to ridicule or disaster. So look up a reference site before you leap. Sometimes you'll find free

ShoPPe 'TiL YoU dRoPPe

Ardent to obtain a turtledove for his lady fair, Lancelot ventured into the marketplace. A great tumult prevailed, for vendors sought to pinion the passing crowds, buyers and sellers haggled over prices, and many a festive banner waved in the breeze.

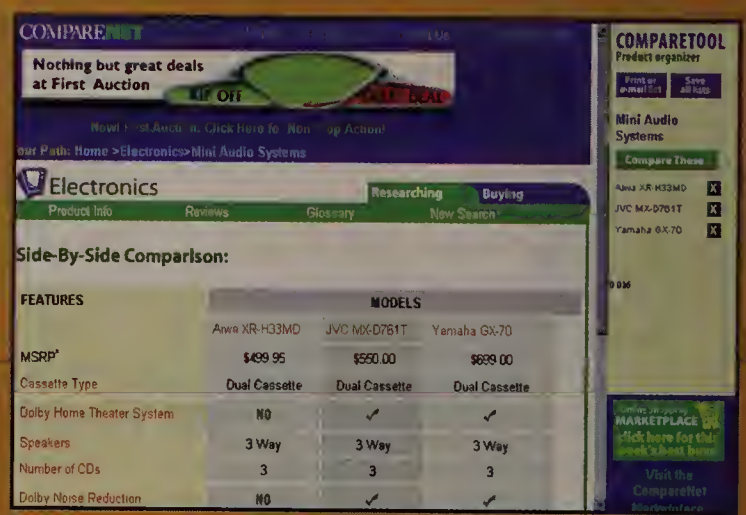
In the old days you had to walk the length and breadth of a marketplace comparing prices, quality of goods, and service. Now you can assemble the same data without ever leaving your chair, provided you have enough patience to click.

Happily, shopping bots, or search agents, can help you find the goods you want and make vendor comparisons. The ill tidings: Most of these shopping search tools don't work terribly well, in the majority of cases allowing you to compare prices among only a limited number of merchants, providing poor searching and browsing tools, and displaying incomplete information about each product. So far, no search engine enables you to find products for sale across the entire Internet. That said, shopping sites are a good place to start looking for products. Just be prepared to check several of them.

If you're only getting started, try **CompareNet (www.compare.net)**. The site's CompareTool frame permits you to save links to the products that you're interested in and then create a side-by-side comparison table showing those products and their features. Regrettably, the heavy use of frames makes it difficult to bookmark pages within the site and might also make CompareNet unsuitable for some browsers.

Both the **HotBot Shopping Directory (shop.hotbot.com)** and **WebMarket (www.webmarket.com)** offer relatively straightforward search interfaces for combing through merchants' online catalogs.

Excite's Shopping channel (www.excite.com/shopping) functions similarly, but it also lets you search for product reviews in a number of categories. **Yahoo Shopping (shopping.yahoo.co)** provides a readily searchable catalog of product categories.



▶ **COMPARENET invites you to compare selected products from your search results side by side.**

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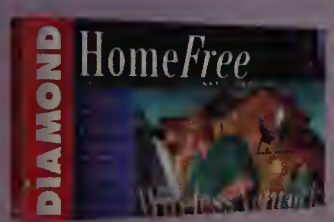

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Put a HomeFree Wireless network card into each desktop PC or laptop you want connected. Shortly, your entire household will be sharing the Internet, printers, and files within a 150' range—without any wires or cables. Plus, HomeFree's frequency-hopping technology means your network is both reliable and secure.

Now, your family can feel more connected than ever. Both HomeFree solutions turn your home PCs into an instant high speed network. And everything you need comes in one box. So you can start enjoying the benefits of home networking immediately.

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access—the excellent dictionary collection **OneLook (www.onelook.com)** and the short version of Encarta are two good starting points. But many sites charge some kind of toll, whether in the form of the price of the Encarta CD-ROM, which gets you full access to the online version, or the monthly fee for **Britannica Online (www.eb.com)** or Electric Library.

The best sites to visit before embarking on your quest are the free ones. OneLook is an epic index of dozens of Web-based dictionaries, ranging from general references like an online version of Webster's to specialized medical and technical word lists. For fans of Arthurian romance, OneLook also contains Brewer's Dictionary of Phrase and Fable. For more encyclopedic information, the free-access articles at **Encarta (encarta.msn.com)** offer decent provisioning, but they're abridged to entice you to to buy the CD and gain full access.

If your quest calls for learning both abstruse and minute, the Britannica Online site contains more information than you will see in the print version and costs just $5 a month. Britannica Online also gives you a free peek into the site's inner sanctum with a seven-day no-cost trial, which is worth taking advantage of. A longer and wider-ranging trial can be had from Electric Library (see page 177), a search tool that scours millions of articles from World Almanac, Collier's and Columbia encyclopedias, and thousands of magazines, newspapers, books, and even transcripts of radio and television programs.

The only drawback of Electric Library is its sheer scope—it's so broad that, even when you restrict the search to a single resource (such as books), you can invoke a forest of references that obscure the Grail instead of isolating it.

Technical Support

WHEN THEY *came at last to draw the sword from the stone, it was stuck fast and would not move...*

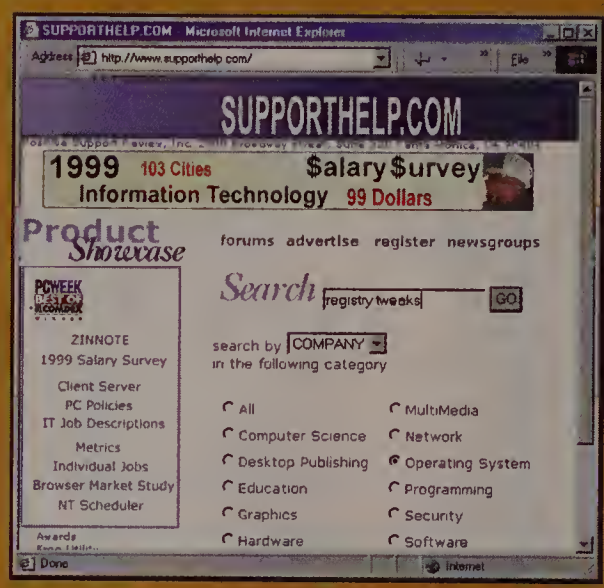
When some evil enchanter has cast a spell on your hardware, you need your own personal Merlin to undo the damage. But he's usually busy on another call, and you're forced to endure the strains of Muzak while you wait. If you can trace the problem to a Microsoft product (insert joke here), your first port of call should be **Microsoft's KnowledgeBase (support.microsoft.com/support/search)**, a nicely precise collection of articles highlighting problems, bugs, fixes, downloads, and how-tos. The frustrating downside: Some articles describe your problem to a T but provide no solution.

If you've got a problem with software from a company other than Microsoft, you may have trouble finding the appropriate support Web site, phone number, or online discussion group. Luckily, **SupportHelp.com (www.supporthelp.com)**. has collected a wealth of such information, and also provides a search form to serve up links based on product or company names. The results include phone support numbers, Web forums, and relevant Usenet newsgroups.

No luck at the official sources? No wonder. Actually, that should read "Try **No Wonder (www.nowonder.com)**." The site includes two search areas: a collection of message boards, and an external database full of how-to and troubleshooting steps. Through No Wonder you can also get free (but sometimes slow) e-mail consultation that's provided by volunteers.

Often, the best technical support comes from your peers, in newsgroups. So fire up your news reader and look for groups whose name starts with, say, microsoft.public (for example, microsoft.public.win98.gen_discussion), comp.os (comp.os.linux), or alt.comp.software (alt.comp.software.financial.quicken).

▶ SUPPORTHELP.COM offers a comprehensive collection of links to major computer vendor sites.



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You can find files from this article at www.fileworld.com/magazine. Matt Lake claims to descend from Sir Lancelot du Lac, but his quest for proof continues. Dylan Tweney, Net Prophet of InfoWorld *and scribe-errant, can generally be found under the sign of dylan@tweney.com. Undistressed damsel Yael Li-Ron is a* PC World *executive editor.* ■

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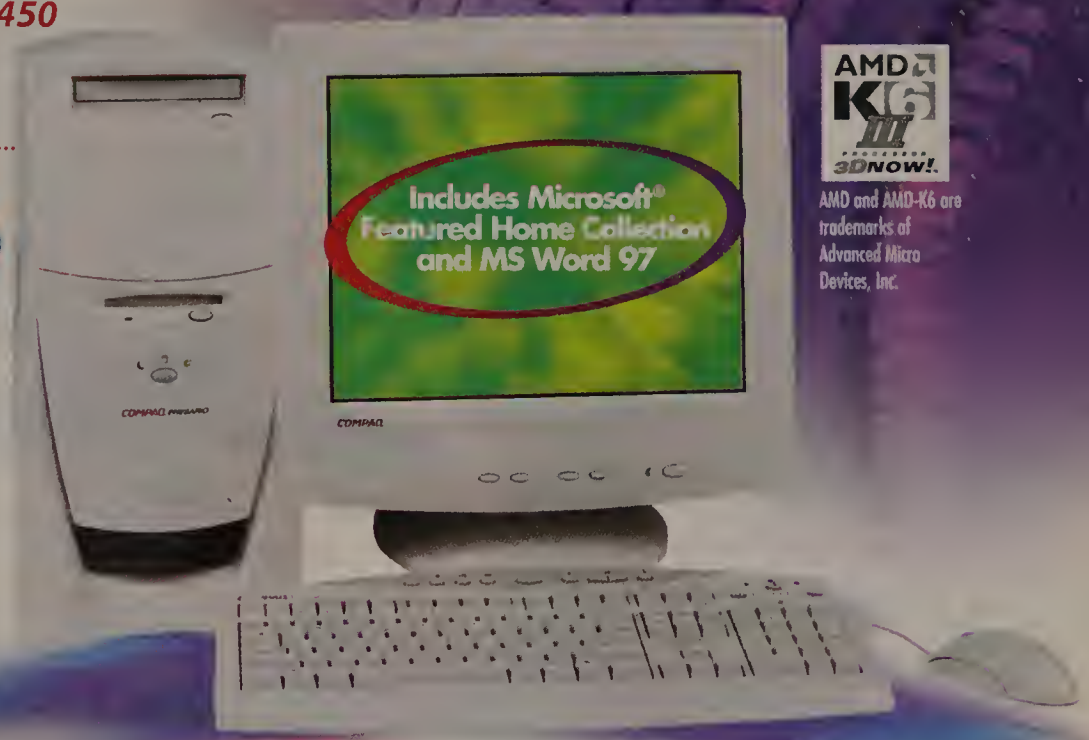

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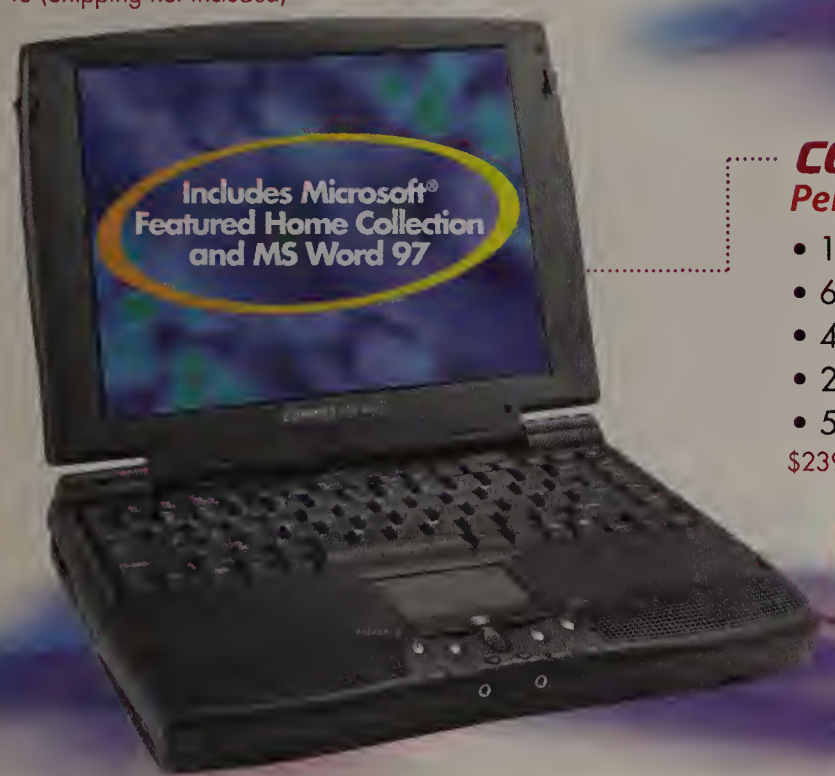

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- 56K ITU V.90 Modem
- Aureal 8820 PCI Audio Card
- ATI 3D Rage LT Pro™ 2x AGP Card With 8MB SDRAM Video Memory
- Phoneline Home Networking
- Digital Creativity Imaging Center With Asymetrix Digital Video Producer
- 10Mbps Ethernet Port - Cable Modem Ready
- Compaq V720 Monitor (15.9" Viewable Image Area)
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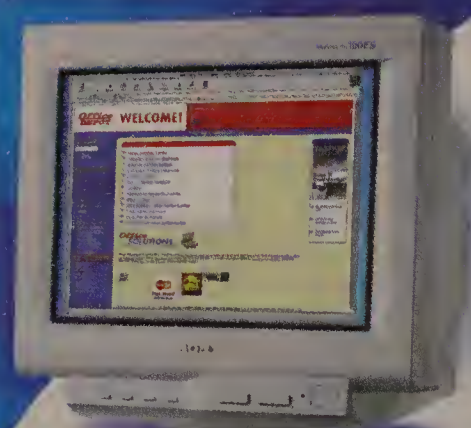
Monitors



Sony CPD-420GS 19" Computer Display
Excellent for high-end graphics
- 19" Trinitron CRT (18.0" Viewable Image Area)
- Super Fine Pitch™ 0.25-.027 mm variable grille
- 1600 x 1200 maximum resolution
- 3-year limited warranty

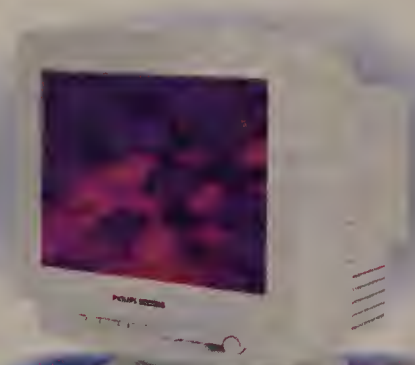
401-164-584 ..... 699.99

Sony CPD-200ES 17" Color Monitor
Perfect images edge-to-edge
- 16" Viewable Image Area
- Super Fine Pitch™ .25 mm Aperture Grille
- 1280 x 1024 maximum resolution

401-342-446 ..... 349.99

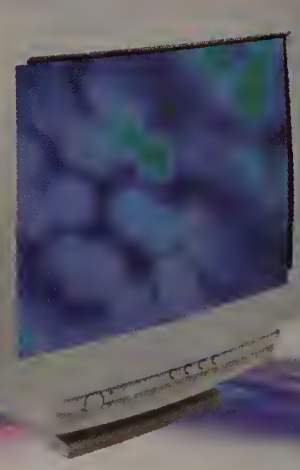
Sony CPD-100ES 15" Color Monitor
Sony quality at a great price
- 14" Viewable Image Area
- Super Fine Pitch™ .25 mm Aperture Grille
- 1280 x 1024 maximum resolution

401-342-455 ..... 199.99



PHILIPS Magnavox 105S 15" Color Monitor
Outstanding quality, great price
- 13.8" Viewable Image Area
- .28 mm dot pitch
- 1024 x 768 maximum resolution
- 3-year warranty

401-315-378 ..... 179.99



PHILIPS Magnavox 107S 17" Color Monitor
See what you've been missing
- 15.9" Viewable Image Area
- .28 mm dot pitch
- 1280 x 1024 maximum resolution
- 3-year warranty

401-315-430 ..... 349.99

COMPAQ "Built For You" Monitors*

Compaq V910 Monitor
- Large 19" Flat Square anti-glare screen (18" Viewable Image Area)
- Plug and play compatibility
- 1600 x 1200 at 75Hz – maximum refresh rate

401-413-486 ..... 429.00

Compaq V1000 Monitor
- 21" (20" Viewable Image Area)
- Plug and play compatibility
- 1600 x 1200 at 85Hz maximum refresh rate

401-162-470 ..... 869.00

Compaq FP700 Monitor
- Stunning 15.0" TFT display driven
- Brilliant 1024 x 768 @ 60Hz resolution
- Sleek, space-saving design
- May require additional video card

401-643-460 ..... 874.00

*Available through our Compaq "Built For You" computer program only. Prices as of 4/1/99 Product availability and prices are subject to change.

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Palm V™ Connected Organizer

Exchange data with your PC

This compact organizer provides instant access to your data, calendar, e-mail, address book, to-do list, memo pad and expenses. It comes in an ultra-slim aluminum case and exchanges data with your PC with just one touch. Also stores up to 6,000 addresses, 5 years of appointments and 200 e-mail messages. Backlighting and LCD screen technology make it easy to read. It's ideal for on-the-go access to all your personal information.

401-161-756 ..... 449.99

Y2K YEAR 2000 COMPLIANT

SHARP OZ-570PC Wizard Organizer

Ideal for business trips and travel

This amazing organizer will keep you on track with its "Zero touch" synchronization and docking station to link to your PC. Also includes 12 telephone directories, a scheduler, and expense manager with tracking report. Lightweight, its compact size makes it ideal for meetings, business trips, and traveling. Includes Day-Timer® software for your PC.

401-381-233 ..... 99.99

HEWLETT® PACKARD Jornada 820 Handheld PC

Works up to 10 hours without recharging

This is the perfect companion to access your e-mail, the web, and create important documents while away from the office. Uses long-lasting, Lithium-Ion rechargable batteries so you can work up to 10 hours without recharging. Features 56K modem and 16MB RAM. Back at home, updating your desktop PC with the new information is a snap! Just connect your HP Jornada to your PC using the sync cable and AC adapter (included) and it automatically synchronizes the information with your desktop PC — as well as recharges itself — so it's ready to go again when you are. With its built-in backup, restore utility and power-on password protection, you can rest assured your data is safe. This lightweight wonder weighs only 2½ pounds.

Available in selected locations only.

401-432-063 ..... 899.99

ROLODEX® RF22192 Organizer

Includes PC Link Kit

This compact, lightweight organizer is perfect for those on the go. Its convenient, go-anywhere design fits right in your pocket. Includes a PC link kit, 3 phone books, to-do-list...even an Internet directory. A 19-character, 5-line display makes reading and entering data easy.

401-415-162 ..... 39.99

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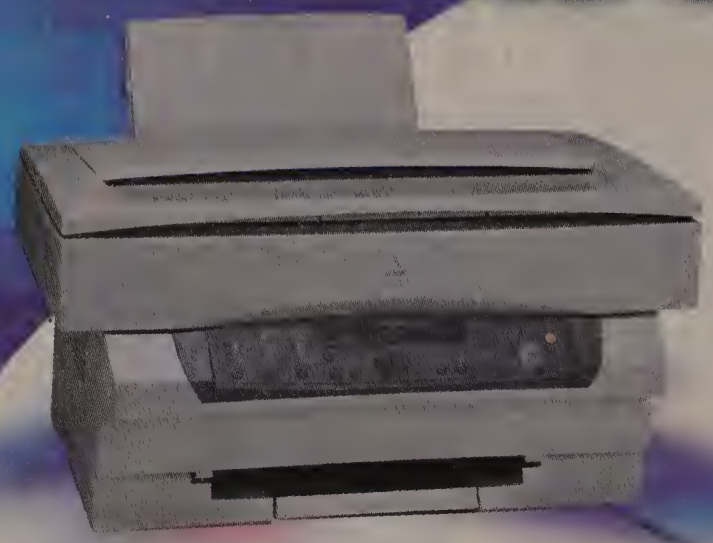
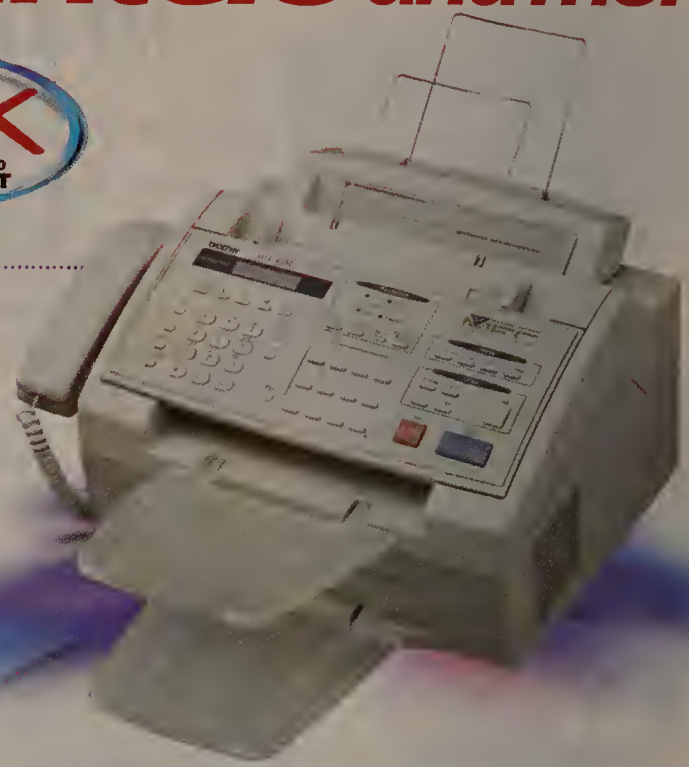
Laser Printers and more





Y2K YEAR 2000 COMPLIANT

Xerox XE80 Digital Laser Copier/Printer

Copier and laser printer in one

Business proposals, presentations, letters...whatever you copy, you'll see the difference with the Xerox XE80 digital copier. Get superior copy quality over traditional analog copiers at up to 6 pages-per-minute. Plus, the XE80 doubles as a high quality laser printer. Prints up to 8 pages-per-minute. Includes Xerox 3-year warranty.

401-408-125 ..... 449.99

brother. MFC-4350

"Do-it-all" Print, fax and copy with one easy-to-use machine

The Brother MFC-4350 is the perfect addition to any small office because it does it all...and with great results! Professional laser quality printing at the touch of a button. Need to fax? With the Brother MFC-4350 you can send and receive faxes at the same time! And the Brother MFC-4350 is also a multi-function copier. Includes printer cables, starter toner and a 1-year replacement warranty.

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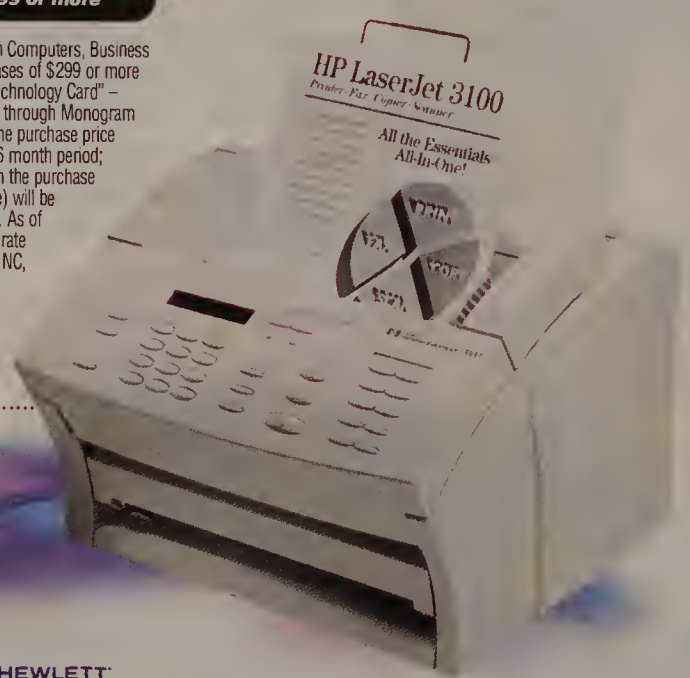

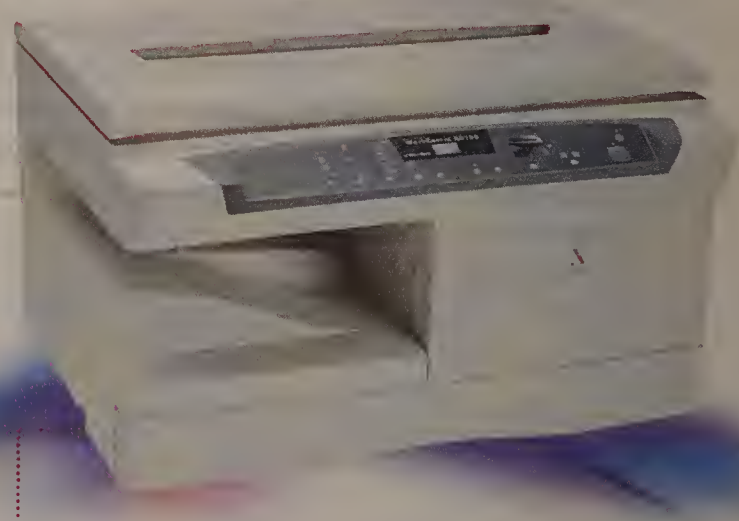

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LaserJet 3100SE All-In-One Machine

Copy, scan and fax simultaneously

For true multi-tasking capabilities the HP LaserJet 3100 is the right choice. It lets you print while receiving or sending faxes, and receive faxes while copying and scanning. Funktions as a laser printer, laser fax, scanner and laser copier. Includes printer cable, starter toner, and a 1-year HP Exchange Warranty.

401-335-258 ..... 699.99

Xerox XD100 Digital Copier/Laser Printer

Outstanding copy versatility

Superior laser printing, exceptional digital laser copy quality, and outstanding photo image reproduction is what you get from the Xerox XD100 digital copier/laser printer. This laser copier and printer-in-one includes a 50 to 200% reduction and enlargement feature for exceptional copy versatility. Plus it provides 600 x 600 dpi laser printing for high-quality results. Includes a 3-year Xerox On-Site Service Warranty.

401-388-799 ..... 549.99

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2000Cse Color Inkjet Printer

Laser speed at a fraction of the cost

Saves up to 30% on printing costs! The HP 2000Cse's separate ink cartridges and long life printheads help reduce waste and save on printing costs over other desktop color printers. HP's smart printing technology tells you when ink is low or a printhead needs cleaning. You'll get brilliant, photo-quality results every time and on any paper. Includes a 1-year HP Express Exchange Warranty (1-business day replacement).

401-367-794 ..... 599.99

HEWLETT PACKARD Expanding Possibilities

LaserJet 2100se Printer

Fast infrared-print without cables

The HP LaserJet 2100Cse printer is a high performance printer that delivers true 1200 x 1200 dpi for superior image quality on any paper. Prints up to 10 pages-per-minute. Includes a 1-year HP Express Exchange Warranty.

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LaserJet 2100TN

Network ready right out of the box

Get all the great performance features of the HP LaserJet 2100, plus a pre-installed HP JetDirect 600N (EIO) Internal Print Server, making it network ready out of the box.

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HEWLETT PACKARD Expanding Possibilities

LaserJet 4000se Series Printer

Fast and reliable... It's the perfect network printer

The HP LaserJet 4000se is the perfect printer for workgroups. Featuring the latest in network printing technology and unparalleled quality, reliability and compatibility, the HP LaserJet 4000 series printers includes a 17 pages-per-minute engine and 100MHz RISC processor for faster printing. HP's PCL6 and Postscript Level 2 Emulation ensures compatibility. And Transmit Once reduces network traffic, allowing you to return to applications quicker. The HP 4000se also features a 600-sheet standard input capacity which reduces restocking.

401-285-944 ..... 1149.99

HEWLETT PACKARD Expanding Possibilities

LaserJet 4000N

The same features as 4000se plus 8MB memory and print server for Ethernet connect.

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HEWLETT PACKARD Expanding Possibilities

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The same features as 4000N plus two 250-sheet paper trays.

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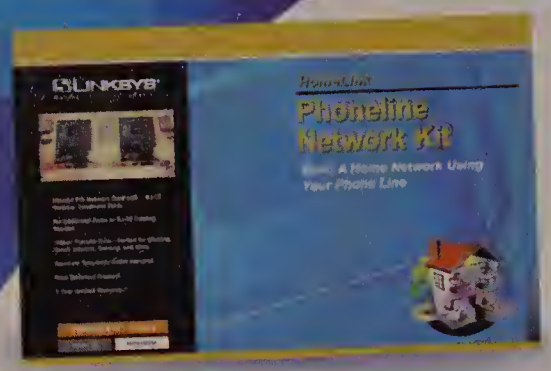
Home and Office Networking



Linksys HomeLink Phoneline Network

Build a network using existing telephone lines

- Share a modem and ISP connection
- Free technical support
- Includes installation CD-ROM

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Linksys EtherFast 10/100 LAN Card

- Auto-sensing
- EtherFast 10/100 LAN
- 10 Base T and 100 Base TX Port
- Fast Ethernet
- 32-bit, PCI adapter card

401-160-276 ..... 29.99

Linksys Fast Ethernet Network Starter Kit

Includes everything you need to build a 2 computer Network

- Supports up to blazing 100Mbps
- Fast Ethernet Speed
- Free technical support and software upgrades
- Limited lifetime warranty

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Linksys Networking Card HomeLink™ PCI

"Do-it-yourself" network using existing phoneline

- No hubs or extra cabling needed
- Wingate modem sharing software allows up to 3 users to share Internet access
- Share printers or play networked games simultaneously

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Linksys USB Ethernet Converter

Instant networking for computers equipped with a USB port and Windows® 98

- Never open your computer – connect adapter to the USB port and connect to the network

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Belkin Pro Series Ethernet Cables

- Category 5 rated cable
- PVC cable jacket
- Gold-plated copper contacts

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14' Blue	401-360-924	9.99
25' Blue	401-360-951	12.99
50' Blue	401-360-979	21.99
7' Gray	401-360-844	7.99
14' Gray	401-360-773	9.99
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Category 5 Ethernet Cables

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Improved multi-picture burst capabilities

- 1.6 Megapixel Resolution (1548 x 1032),
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8MB picture card included

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- 3x zoom lens, 3x optical and 2x digital zoom

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PhotoSmart Photo Printer

Prints photos that look and feel like real photos

- Make reprints, enlargements and personalized photos

401-106-843 .....199.99

HEWLETT PACKARD Expanding Possibilities

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Delivers excellent digital photography results

- Delivers sharp 1 Megapixel (1152 x 872) Resolution
- 2x digital zoom
- 8MB picture card

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Pull video & audio from your video camera, VCR or any video source

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Includes ZIP™ Tools software

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- Connects easily to your parallel port

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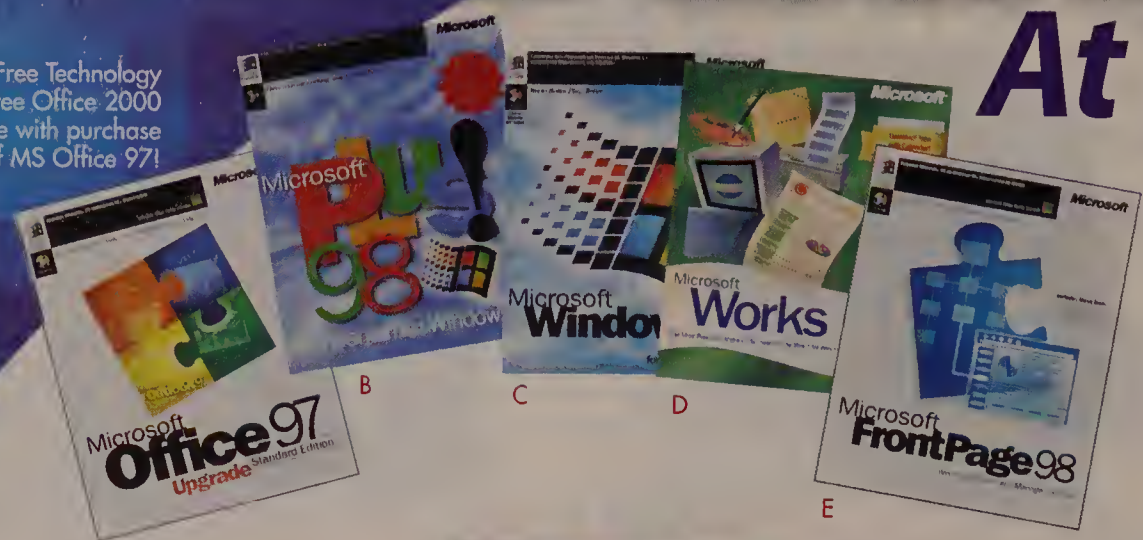
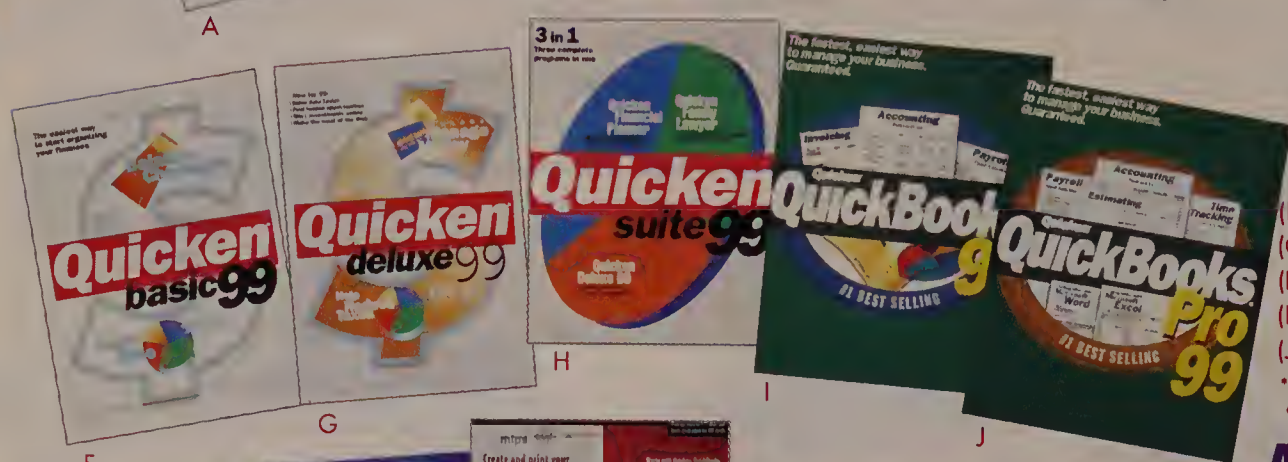


A B C D E

Great Software from Microsoft

(A)	MS Office 97 Upgrade	186-197	159.99*
(B)	MS Plus 98	361-415	39.99
(C)	Windows 98 Upgrade	361-282	89.99
(D)	MS Works	424-517	49.99
(E)	MS FrontPage 98	275-768	89.99*

*Pricing shown reflects final price after Mail-In Rebate or Upgrade Rebate. See store for details.



F G H I J

Quicken Finance Solutions

(F)	Quicken Basic 99	475-338	14.99*
(G)	Quicken Deluxe 99	475-356	39.99*
(H)	Quicken Suite 99	475-374	69.99*
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K L M N O

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(K)	MS Money Basic 99	405-896	19.99*
(L)	MS Money Financial 99	405-798	29.99*
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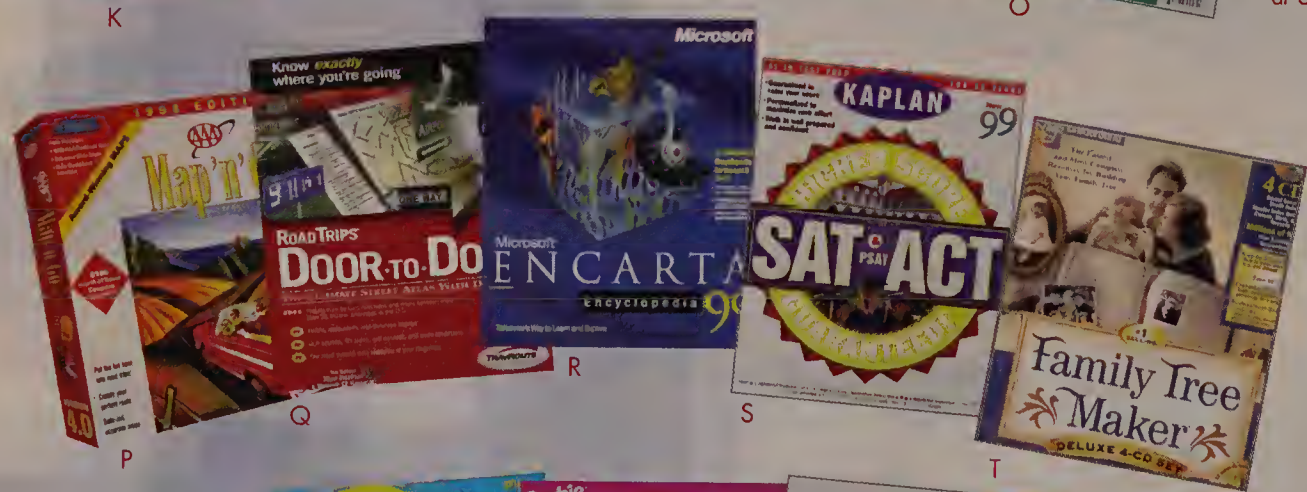

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(P)	Map 'n' Go	356-895	19.99
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(R)	Encarta	405-887	9.99*
(S)	SAT/ACT	386-470	29.99
(T)	Family Tree Maker	387-451	29.99*

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Games for the Kids

(U)	Just Me & My Dad	516-500	9.99
(V)	Teletubbies	431-974	19.99
(W)	Barbie Riding Club	427-845	39.99
(X)	Monopoly	735-951	19.99
(Y)	Madden 98	423-037	14.99

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(C)	Year 2000 Now	114-273	49.99
(D)	Norton 2000	504-280	49.99

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(E)	Norton AntiVirus	404-806	19.99*
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(G)	Uninstoller	362-307	49.99
(H)	First Aid 2000	819-431	39.99
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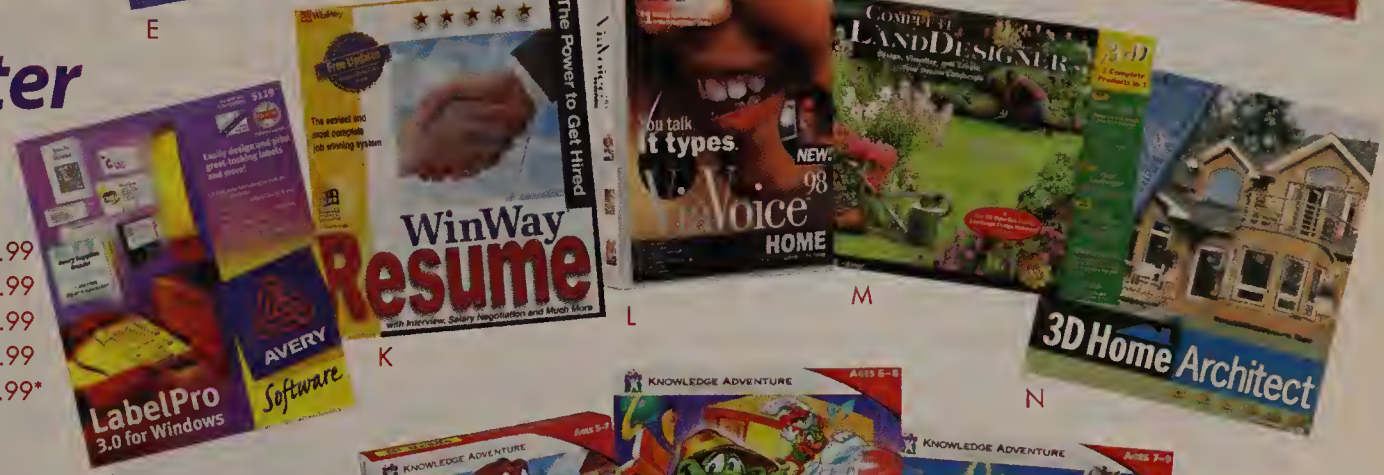
(J)	Avery LabelPro	206-325	34.99
(K)	WinWay Resume	429-095	39.99
(L)	VioVoice Home	389-556	49.99
(M)	Complete Land Designer	169-142	44.99
(N)	3D Home Architect	133-065	29.99*

*Pricing shown reflects final price after Mail-In Rebate or Upgrade Rebate. See store for details.



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(O)	Kindergarten	270-638	19.99
(P)	1st Grade	516-161	19.99
(Q)	2nd Grade	516-211	19.99
(R)	3rd Grade	242-883	19.99
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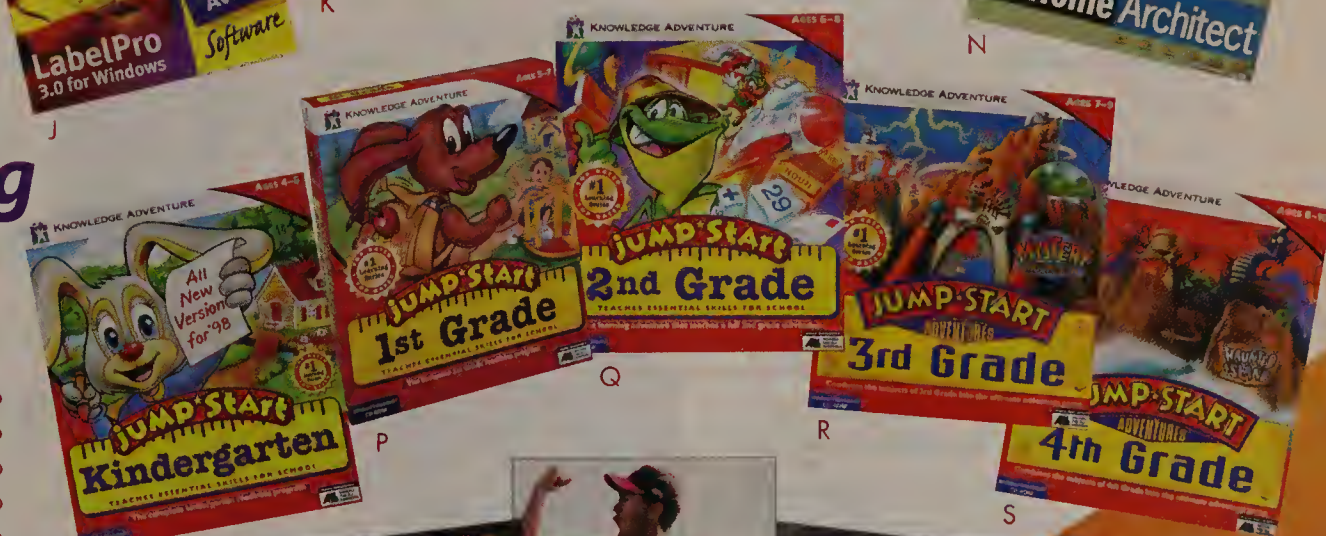

Games for You!

(T)	Deer Hunter	314-477	14.99
(U)	Deer Avenger	811-359	19.99
(V)	Tiger Woods Golf 99	405-681	24.99
(W)	Riven	278-033	24.99*
(X)	Sim City 3000	503-432	49.99

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This executive digital phone features no roaming charges, speakerphone, 2-way radio and vibration alert. Achieve better clarity with an all digital national network, including text and numeric paging. Also includes talk time up to 180 hours and phone-standby time up to 50 hours.

401-411-246

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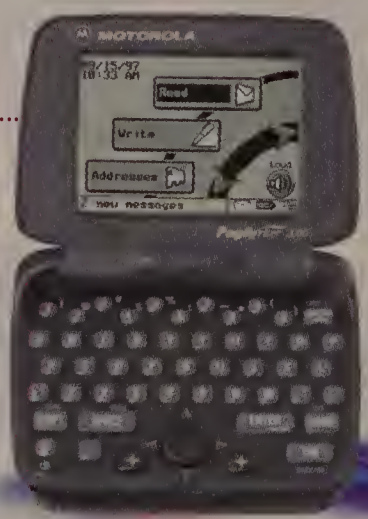
This digital phone makes communication easy with 2-way radio capabilities. Includes text and numeric paging with display icons. Save on calls with no roaming charges. Features 9 selectable ring styles.

401-384-043

†Not available in all stores.



SkyTel MOTOROLA Pagers

PageWriter 2000

This powerful package features a full keyboard and graphic display, allowing you to communicate wirelessly with one or two-way pagers, fax machines and Internet e-mail addresses. It's small enough to wear on your belt or carry in pocket. Operating on a rechargeable NiMH battery, it gives you over one week of uninterrupted usage and fully recharges in one hour. Confirmed Message Delivery lets the paging system track and confirm delivery of your messages, letting you know for sure that your messages are received.

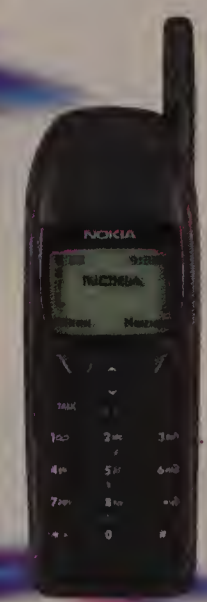
401-902-215 .....399.99

MOTOROLA Pagers

PF1500 Word Message Pager

You won't miss a message with this pager, including messages that were stored when you were out of range. The 1500 also allows you to reply to messages that you receive. Features a large screen, Optimax EL™ Electra Light display for easy reading.

401-902-233 .....199.99



Sprint® Sprint PCS™

Qualcomm 1920

This popular Sprint PCS phone stores up to 99 numbers and includes a large 5-line LCD display. Includes dial shuttle and voice mail.

401-403-362

AT&T

NOKIA 6160

It's one of the smallest phones on the market, offering a wide variety of features. Includes unbeatable on clarity, voice and text messaging, and calendar functions including an alarm clock. Also supports Caller ID.

401-368-686

beepwear

Pro Watch Pager & Organizer

This Pro Watch Pager stores 150 names and numbers. As you travel, it updates the time & supports two time zones simultaneously to keep you on track. It stores up to 16 messages and includes a Timex Data Link system. Download organizer data from your PC and have the information at your fingertips.

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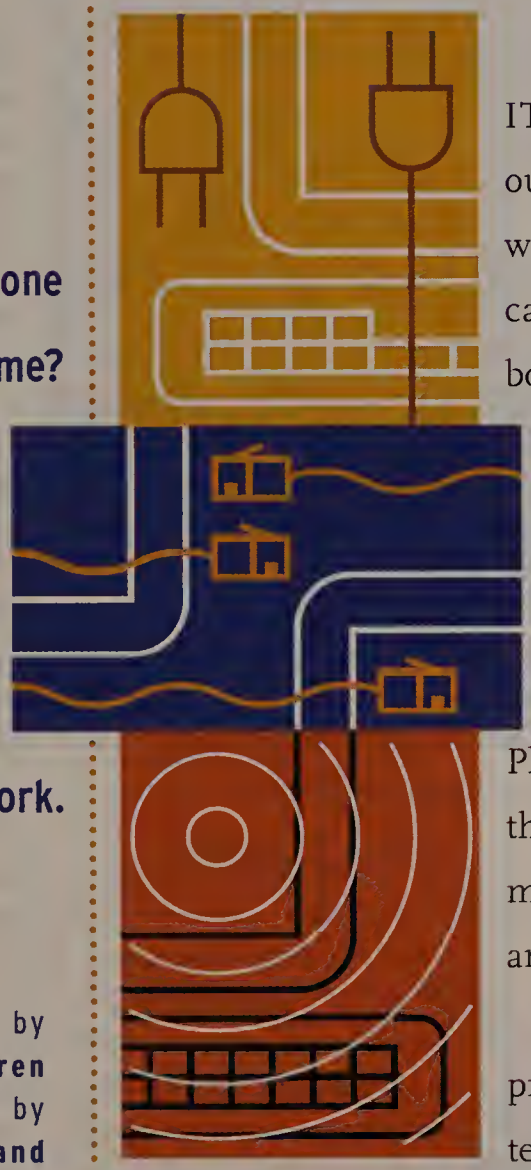
BY MEL BECKMAN

Have more than one computer at home? Easy, inexpensive kits help you share Web access, printers, and files on your own network.



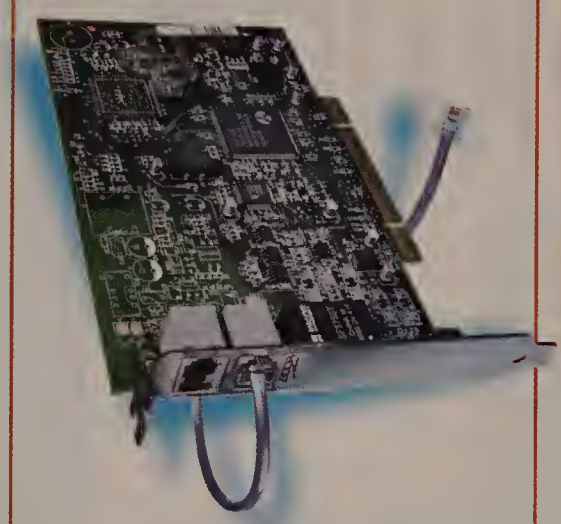
Illustrations by **Anders Wenngren**
Photography by **Kevin Candland**

IT SEEMED SUCH an obvious decision. Sharing one PC with your nuclear family was causing a meltdown, so you bought a second one. Everybody was happy, right? Not for long. For one thing, you still have just one Internet service account, and everyone wants to go online at the same time. Plus, the whole clan wants to use the *new* machine, with its fast modem, color printer, and huge and nearly empty hard drive.

One solution to this thorny problem is to order up another telephone line and a second ▶

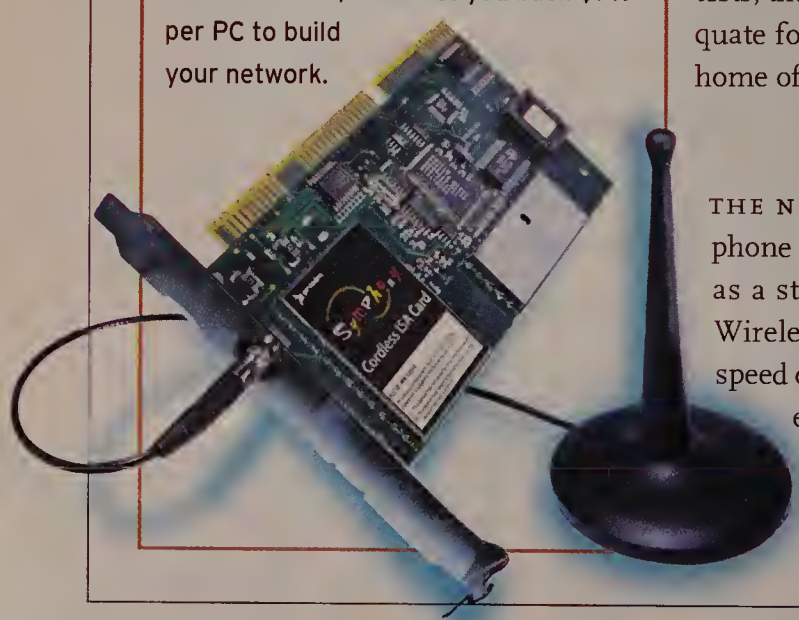
printer. Oh, and invest in some upgrades for that older PC while you're at it. The other answer is to install a network. Networks have never been a joy to to set up. But after looking at seven of the most recent offerings from Boca Research, Diamond Multimedia, Intel, Intelogis, Proxim, and WebGear, we found that—for the most part, anyway—they are fast, secure, and easy to set up.

Best Buys



- If you have two separate phone lines that stretch through your house, or if you plan on connecting to a cable, DSL, or 56-kbps modem, go with Boca Research's **HAN (Home Area Network).** This $109 kit is inexpensive, includes adapters for networking two PCs, and delivers terrific performance

- If a wireless network is a better fit for you, we recommend Proxim's **Symphony Cordless ISA Card.** It's easy to configure and has the best range in its class. However, it will set you back $149 per PC to build your network.



What Kind of Network Do You Need?

The network that's best for your neighbor may not be right for you.

If you...	You need...
Have two or more computers all within shouting distance of a phone line jack...	A relatively cheap and speedy phone-line networking kit such as Boca Research's HAN (Home Area Network).
Dream of a wire-free working environment, or don't already have phone lines where the PCs you want to network are located...	A wireless network like Proxim's Symphony, which has a 100-foot range and can penetrate walls and floors.
Don't have phone-line access and need to cover hundreds of feet of territory...	A power-line network like Intelogis's PassPort. It won't be fast, but it's better than nothing and works well for modem sharing.
Must transfer your data faster than 2 mbps, aren't intimidated by rewiring, and are comfortable setting up Windows networking...	A 10-mbps ethernet setup like 3Com's OfficeConnect Networking Kit. For about $30 per PC you can connect four computers.

For linking your computers together, each of the kits we tested employs one of three different basic technologies that don't require you to install any new long-distance cabling. Instead, they rely on existing wiring—either AC power lines or phone lines—or on radio waves (that is, no wiring at all). As a result, they are far cheaper and easier to install than a typical ethernet network.

Unfortunately, however, simplicity comes at the cost of lower performance. The speed of home networking products—which ranges between 350 kilobits and 2 megabits per second—is a far cry from an ethernet's 10 to 100 mbps. Nonetheless, based on our performance tests, these products are more than adequate for many of today's small office/home office applications.

LEARN TO SHARE

THE NETWORKS that use your home's phone lines are about one-third as fast as a standard ethernet connection. Wireless products run about half the speed of a phone-line setup. And slowest of all, based on our only representative in the category, is a device that uses your home's electrical wiring.

All seven products we looked at have software that lets multiple users surf the Web simultaneously through one Internet connection. But when it came to sharing the Net, all the products turned in nearly identical performance numbers, suggesting that they all outperform a 56-kbps modem. (For more details on home networking performance, see "Nowhere Near Ethernet" on page 202.)

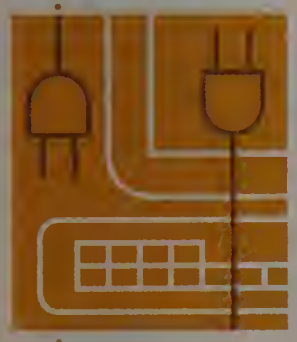
PICK THE RIGHT CONNECTION

BEFORE YOU BUY any home networking product, make sure you know which type of wiring (or wireless) scheme best suits your needs.

In a home, you'll want to take into account how much distance separates your PCs and where the nearest phone jacks are located. If your phone jacks are readily accessible, go with something in the phone-line class. Not comfortable opening up your PC? Settle for a device that simply plugs into an AC outlet.

If you're networking a small business, you probably have phone jacks in all the right places, and you'll appreciate the speed of the phone-line offerings. But if you're setting up your network in temporary quarters, go wireless—the increased mobility will be worth the extra cost.

POWER-LINE Networks



A TYPICAL power-line networking package consists of either two or three small boxes that plug directly into standard AC electrical sockets, plus cables for connecting the box to each PC's parallel port. Given that every computer requires AC power (even notebooks recharge using an AC adapter), it's a good bet that you'll be able to make a connection this way.

There is one caveat, but it applies mostly to businesses, not homes: None of the local power company's AC transformers can be located between any of the AC sockets you're using for networking. This is not a problem for most residences, since transformers usually are situated outside the home and shared by several neighbors. But ironically, this placement of the transformer creates its own hazard: a potential security risk for the home user. If your neighbors share that transformer perched on the power pole out on the street, they may also share your network wiring. So some form of network security, usually data encryption, is essential in power-line products.

INTELOGIS PASSPORT

INTELOGIS'S $200 PassPort kit includes networking modules and parallel cables for two PCs. It also comes with a handy and all-too-rare extra feature: a special printer module that turns your printer into a stand-alone networking device. Most home networks assume that your printer is plugged into a PC; so if you want to print over the network, you have to make sure the PC with the printer is turned on. But with PassPort's printer module, you leave just the printer on. Another advantage: You can put the printer in a central location.

We found the PassPort hardware extremely simple to install, taking us only a few minutes per machine. A quick-start guide shows how to plug in the modules; it also warns against connecting them to a surge suppressor, which can filter out PassPort's data signal. Intelogis also supplies line conditioners that plug into each PC's power line and prevent computer noise from interfering with the network's data signal. PassPort's range of 2640 feet should be adequate to network even the grandest mansions.

PassPort's driver software comes on a CD-ROM and installs easily, but you'll have to configure your Windows network settings manually—putting PassPort at a distinct disadvantage compared to products that include an interactive wizard for setting these. Fortunately, Intelogis's well-written user guide provides step-by-step instructions for setting up Windows file and printer sharing.

To keep the neighbors from accessing your PassPort network, Intelogis creates an exclusive, private group of machines. You use the PassPort administrative utility, for instance, to identify the modules by their ID numbers. The administration program ensures that the data flowing over your power lines remains secure through encryption.

PHOTOGRAPH: WILL MCINTYRE

Would Eli Bentor recommend a home networking kit?

No

The test: Eli Bentor, a professor at a North Carolina university, connected his daughter's upstairs PC—including a 56-kbps modem, a scanner, and a printer—to his bare-bones computer downstairs. He used the AC-power-line-based Intelogis PassPort.

His experience: "The installation of the PassPort hardware and software went smoothly. The documentation was all very clear and elegant, and the product worked very much like a regular network. But when the refrigerator kicked in, the network simply disappeared."

A MIXED BAG

BUT WHAT PASSPORT offers in ease of setup, it takes away in slow performance. Its rated transfer speed of 350 kbps falls substantially below the megabits-per-second speeds of the competing wireless and phone-line products. In our performance tests involving file, application, and printer sharing, PassPort took more than 5 minutes to complete most of our tasks—two to three times longer than the fastest home networking product we looked at. And the lack of visible progress indicators occasionally left us wondering whether the network was even working.

Slow as it is, the PassPort network performs many times faster than a typical modem, so it works well for sharing an Internet connection. It had no trouble maintaining a 56-kbps modem connection at full blast, even when two people were using the Internet simultaneously.

For sharing your Internet connection, Intelogis bundles WinProxy. With this utility, which comes with a five-user ▶

license, you designate one computer as a modem-sharing host and install special proxy software on each of the client computers in your network. WinProxy uses several common protocols, including those for the Web, FTP, e-mail, Telnet, and Usenet. Setting up WinProxy is straightforward, but configuring the client can be tricky—when we made a mistake, we found it difficult to get back to a clean starting point to rework the configuration.

Power lines are notorious conduits for electrical noise and radio interference. In a home or small office, almost anything with an electrical motor can cause problems. When we tested the PassPort network with a typical home electrical-noise generator (a hair dryer) turned on, PassPort's file-sharing performance slowed by up to 40 percent—whether the appliance was running near our computers or at a substantial distance from them. The hair dryer affected Internet access much less severely but still caused noticeable slowdowns.

Other electrical-noise generators—furnaces, vacuum cleaners, air conditioners, and the like—could very well cause a similar degradation in network performance. You may be able to live with such periodic disruptions, but in any case consider your home's physical environment before you settle on PassPort.

PHONE-LINE Networks

LIKE POWER-LINE networking, phone-line products use wiring that's already installed in your house. But instead of plugging into an AC outlet, they connect to phone jacks. All three phone-line products we looked at consist of adapter cards that you install, one in each computer. A standard extension line connects the card to a phone jack. Assuming that you also have a modem connection, a phone-line splitter lets you plug the phone and modem lines into one jack.

A lack of convenient phone jacks may be the biggest gotcha with phone-line kits. Adding jacks can be costly—technicians charge from $25 to $50 for each one installed—and in some cases, the job may require drilling holes through your walls and floors. And unlike with power-line and wireless networks, you can't use these products in offices where digital phone lines prevail.

Of the three phone-line packages we reviewed, Boca Research's Home Area Network and Diamond Multimedia's HomeFree Phoneline compete neck and neck, although Boca earns our Best Buy accolade. Intel's AnyPoint Phoneline Network kit was still in preproduction form when we tested it. Because price, features, and performance can change in a final release, we have to withhold recommendation on AnyPoint. (The final version shipped in early April and is available for purchase now.)

BOCA PILOTS THE PHONE-LINE PACK

CHOOSING BETWEEN Boca's $109 HAN kit and Diamond's $99 HomeFree Phoneline was tough. Both were faster than the other networks in our tests (except for our ethernet baseline) and transferred data over 400 feet of spooled phone cable. They're the least expensive in the roundup, too. Each kit includes everything you need to network two PCs, including PCI cards, phone extension cables, and CD-ROM–based installation software. (Nodes for additional PCs cost extra.) We give the edge to Boca's HAN, considering its ability to bridge two phone lines within your

HOME NETWORKS FEATURES COMPARISON

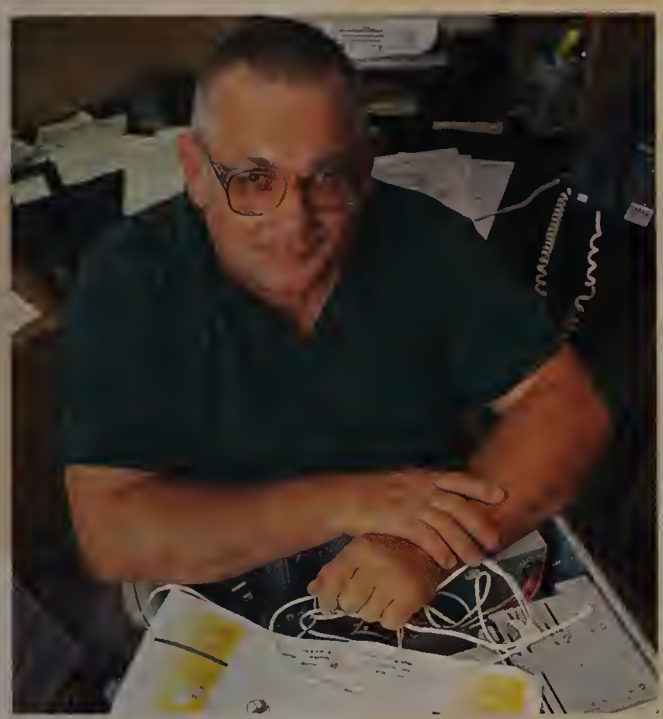
PRODUCT	Street price (3/23/99)	Approximate networking price per computer	Connection type	Vendor-claimed transfer rate	Vendor-claimed range (feet)	Operating system support	Interface options
Boca Research Home Area Network 561/997-6227 www.bocaresearch.com	$109	$55	standard copper phone line	1 mbps	500	Windows 9x, NT	PCI
Diamond Multimedia HomeFree Phoneline 888/947-8778 www.diamondmm.com	$99	$49	standard copper phone line	1 mbps	500	Windows 9x	PCI, ISA
Diamond Multimedia HomeFree Wireless 888/947-8778 www.diamondmm.com	$189	$95	wireless	1 mbps	150 (in open air)	Windows 9x	PCI, ISA, PC Card
Intel AnyPoint Phoneline Network 877/649-5817 www.intel.com	$189	$95	standard copper phone line	1 mbps	500	Windows 9x, NT	PCI, parallel port
Intelogis PassPort 801/571-4000 www.intelogis.com	$200 [2]	$100	AC power line	350 kbps	2640	Windows 9x	parallel port
Proxim Symphony Cordless ISA Card 650/526-3780 www.proxim.com	$149	$149	wireless	1.6 mbps	150 (in open air)	Windows 9x	ISA
WebGear AviatorPro 877/932-4327 www.webgear.com	$249 [3,4]	$249 [5]	wireless	2 mbps	500–1000 (in open air)	Windows 9x	ISA, PC Card

Best Buy

[1] For more information about all products in this table, select product info no. 903 or visit www.pcworld.com/productinfo.

[2] Kit includes two parallel cables and a module for a stand-alone printer.

[3] List price.



PHOTOGRAPH: MICHAEL PRICE

Would John Surkan recommend a home networking kit?

The test: John Surkan, a small-business owner from Port Charlotte, Florida, wanted to connect computers in different parts of his home. We gave him Diamond's HomeFree Phoneline kit.

His experience: "I installed it on my office PC and on another PC in the living room, about 75 feet away, but the PCs couldn't 'see' each other. So I moved one computer to the next-closest room with a phone jack, the kitchen, and it worked. But I wasn't too happy having a PC on my kitchen counter."

No

house and its robust Internet sharing.

Diamond's HomeFree Phoneline requires that you use a single physical phone line for the entire network. If you have two or more separate lines (that is, lines with different phone numbers), you must choose one of the lines to run your network, and that line must be available everywhere you have a computer. (HAN solves this problem with a clever trick: Its PCI card includes two phone jacks, which you can use to bridge the HAN network across two different phone lines while still keeping voice traffic on the lines separate.)

The two products differ in the way they handle configuration. When we set up Windows file and printer sharing, for instance, HomeFree automatically installed the driver and then walked us through the process manually. HAN takes automation one step further: After installing the driver, its online wizard chose the network protocol, adapter, and appropriate type of file sharing for us—although we still had to configure Windows file sharing manually.

Luckily the Boca HAN's setup is mostly automated—the documentation leaves a lot to be desired. A brief printed quick-start guide gets you going, but you must read the comprehensive online documentation to set up a network properly from scratch. HomeFree's printed documentation has more polish than HAN's, including detailed installation instructions with helpful photos and screen shots.

All three phone-line products we tested ran at the vendors' claimed transfer speed of 1 mbps, which accounts for their excellent test-report scores. In our file sharing tests, both HAN and HomeFree Phoneline were about twice as swift as their wireless competition. In sharing a 56-kbps Internet connection, neither product showed any degradation in overall speed, even though the bandwidth was divvied up between two PCs.

HAN bundles the modem sharing app—MidPoint Companion Lite 1.0 from Midcore Software. For a "lite" version, its features are impressive. The software is designed to work with any Windows-supported technology, including analog modem, ISDN, cable modem, and DSL, making HAN a practical choice for sharing broadband connections. Of all the modem sharing software we looked at, MidPoint 1.0 was the easiest to set up, installing smoothly and problem-free.

> In our file sharing tests, both **HAN and HomeFree Phoneline** were about **twice as fast** as their **wireless competition.**

HomeFree comes with GateKeeper—a component of Deerfield.com's WinGate version 3.0 Home Internet sharing utility. The software supports all types of Internet connections, including cable modem, ISDN, DSL, and 56-kbps modems. Once we ran the basic installation and tweaked the setup a bit, GateKeeper worked well. Regrettably, while installation is not difficult, the terse setup guide provides little help. It covers Internet traffic-monitoring features but ignores content control, Web caching capabilities, and robust user monitoring. ▶

Comments	Product info number [1]
PRO: Good performance and price, shares cable and DSL connections, Internet sharing software installs easily, bridges two phone lines. **CON:** Requires phone jack for each PC, so-so documentation, no network management tool.	639
PRO: Least-expensive phone-line product, good performance, excellent documentation. **CON:** Requires phone jack for each PC you want to network, limited Windows network configuration aid, no network management tool.	640
PRO: Excellent documentation, no wiring involved, easy to install, includes network management tool. **CON:** Fixed antenna, throughput slows with distance.	641
PRO: Easy to install, sophisticated installation wizard, excellent documentation. **CON:** Requires phone jack for each computer in the network.	642
PRO: Wide range, works in many different home environments, comes with module for stand-alone printer connection. **CON:** Slow, subject to interference, Windows sharing setup must be done manually.	643
PRO: Relocatable antenna, includes network management tool, no wiring required, easy to install, optional stand-alone modem. **CON:** Cost per computer is high.	644
PRO: No wiring required, easy to install, inexpensive for laptop-to-laptop connections. **CON:** Fixed-location antenna, expensive for PC-to-PC connections, limited range, no network management tool.	645

[4] Kit includes two PC Cards and one ISA card to adapt PC Card to desktop PC.

[5] Price per desktop PC. (Price per laptop is $125.)

INTEL IN THE WINGS

INTEL'S $189 AnyPoint Phoneline Network provides both PCI and parallel port adapters—unlike its phone-line competitors, which offer just PCI and/or ISA configurations. Otherwise, AnyPoint networks two PCs in much the same way as HAN and HomeFree Phoneline. We found the preliminary documentation exceptionally well done, and our installation experience was very smooth.

AnyPoint lacks HAN's convenient phone-line bridging capability, but its automated network configuration tool surpasses what either of its rivals offers. In file and application sharing tests, it did not fare as well as HAN or HomeFree Phoneline; however, that may well change in the shipping version. Intel says the final version of AnyPoint will include Internet and printer sharing, and will sell for $95 per PC—steeper than HAN's price of $55 per PC and HomeFree Phoneline's price of $49 per PC.

WIRELESS Networks

NO WIRES AT ALL? What could be better? If you don't mind their higher cost (up to five times more per PC than wired products) and relatively limited range, wireless nets can be easier to set up and are far more flexible. In fact, wireless is ideal for businesses setting up temporary offices.

Most wireless networking products use radio-frequency signaling to send data between computers. But this isn't the same as the simple AM or FM signals you receive on your radio. Wireless LAN broadcasts a sophisticated signal called *spread spectrum*, which sends out data over a wide range of radio frequencies. Spread spectrum lessens noise interference and permits data rates to slow down or speed up, depending on the quality of the signal.

With wireless, distance definitely matters—as does anything that stands between two wireless-equipped PCs, like walls, ceilings, and metal air ducts. Most wireless RF-based products can cope with a limited amount of structural interference (a few interior walls or floors, say), but at some point, too many obstructions will choke off the signals.

PROXIM WINS THE WIRELESS WAR

TWO OF THE THREE wireless networks we tested, Diamond's $189 HomeFree Wireless ($95 per PC, two cards per kit) and Proxim's Symphony Cordless ISA card ($149 for one PC), compete closely in performance and features and are based on PCI and ISA adapters, respectively. (WebGear's AviatorPro is the third wireless network we examined.)

Symphony's movable antenna—a short, freestanding vertical post that attaches to the adapter card by a quick-disconnect cable—improved the range of the product. When positioned in the clear, some distance away from PCs and any interfering office furniture, the antenna gave Symphony a better range than its competitors achieved.

Symphony's documentation was the easiest to follow, with HomeFree Wireless's a close second. Both include clear illustrations and screen shots, and troubleshooting information (online, in HomeFree's case). Because we tested a preproduction version of WebGear's AviatorPro, its manuals weren't complete. A quick-start guide explained installation with few illustrations or screen shots. There was no user guide or Internet sharing software, either, so we couldn't pass judgment on these (nor could the prerelease AviatorPro compete for a Best Buy).

Like power-line networks, wireless networks raise data security concerns. Yet of the three wireless products we tested, only Symphony clearly addressed security issues in its documentation. It also requires a unique security code on all connected computers and provides an encryption key.

Both HomeFree Wireless and Symphony include administrative and ▶

Would Alanna McAlorum recommend a home networking kit?

Yes

The test: To debunk the myth that you must be a network technician to get connected, we gave Proxim's Symphony wireless networking kit to Alanna McAlorum, a medical research associate in San Francisco.

Her experience: "The hardest part was taking the PC's cover off and putting in the ISA card. I had never installed a network before, and it was easier than I expected. The lack of cords and wires between computers was a big plus to me. As long as users are familiar with installing hardware devices, they won't be intimidated."

PHOTOGRAPH: ANDY FREEBERG

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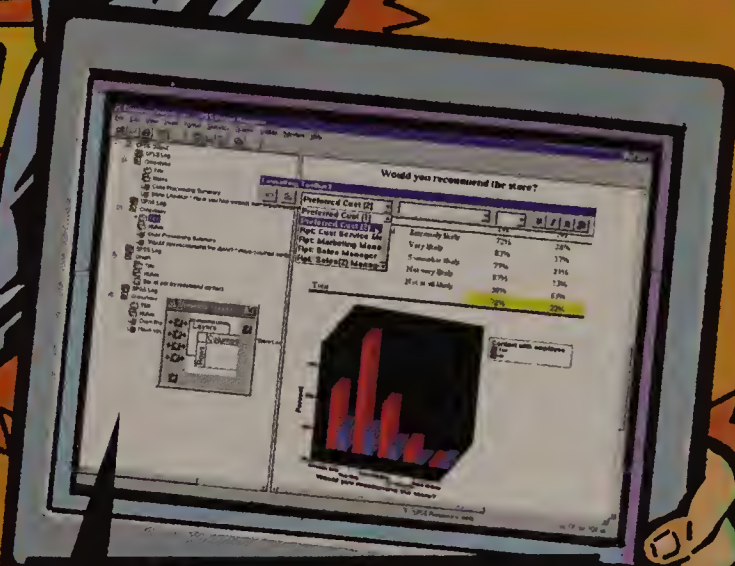

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troubleshooting tools for verifying network connections and performing network tests. The prerelease AviatorPro lacked these tools. However, WebGear does sell a wireless bridge, Access Point, that includes administrative, management, and diagnostic tools. And according to WebGear, the shipping version of AviatorPro will include diagnostic tools.

We tested both the short- and the long-range performance of these wireless networks in a typical home setting, with walls and a floor separating the computers (for details, consult "How We Test" at www.pcworld.com/jun99/networking). HomeFree Wireless and Symphony both advertise ranges of up to 150 feet (in clear line of sight, with no walls or floors in the way), and they claim data rates of 1 and 1.6 mbps, respectively. AviatorPro's specifications are a bit broader, with a 500- to 1000-foot range and a 2-mbps data rate.

HomeFree Wireless and Symphony delivered similar speeds—about half that of the phone-line products in our file sharing tests—when tested at short range through a single wall. When we separated our test PCs by 100 feet and by two walls and a floor, however, the networks conked out. As distance and barriers increased, the speed of HomeFree Wireless dropped rapidly. Symphony, however, maintained its throughput to the limit of its range, an advantage of its relocatable antenna.

WANT TO KNOW industry luminaries' predictions for home networks of the future? Want to read the details of our network-testing procedure? Check out PC World Online at www.pcworld.com/june99/networking.

At short range or long, AviatorPro's performance lagged significantly behind that of the other two wireless products. In file sharing, AviatorPro took twice as long as its competitors to transfer our 37MB graphics file, and it did poorly in the distance tests as well.

Diamond HomeFree Wireless uses RouterWare's WinNAT (Network Address Translation) 1.0 Internet sharing software, which we found easy to install. Symphony comes with Conductor, Proxim's own proprietary modem sharing software, which we found painless to set up and configure. Both HomeFree Wireless and Symphony can share the common suite of Internet protocols—including Web, FTP, e-mail, and Telnet—and they can both be configured for custom protocols such as ICQ.

We also looked at Proxim's clever wireless Symphony Cordless Modem, a self-contained 56-kbps modem with a Symphony wireless interface. This $250 device gives anyone on the network access to the Internet without having to depend on there being another computer running.

AVIATORPRO IN PROGRESS

THE PRERELEASE version of WebGear's AviatorPro we tested came with two PC Card adapters and one ISA card converter. Best for networking two notebooks or a notebook and a PC, it's pricey for desktop-to-desktop connections. If you need only the PC Cards, the cost is $125 per machine. But if your PC lacks a PC Card reader, you'll have to pay $249 per desktop for the complete kit.

Proxim and Diamond offer PC Card options for $199 and $169, respectively. (WebGear sells a parallel port–based Aviator for $119 and the Universal Serial Bus–based AviatorUSB for $149; both are rated at 1 mbps.) AviatorPro is the only product we looked at that supports the 802.11 wireless standard.

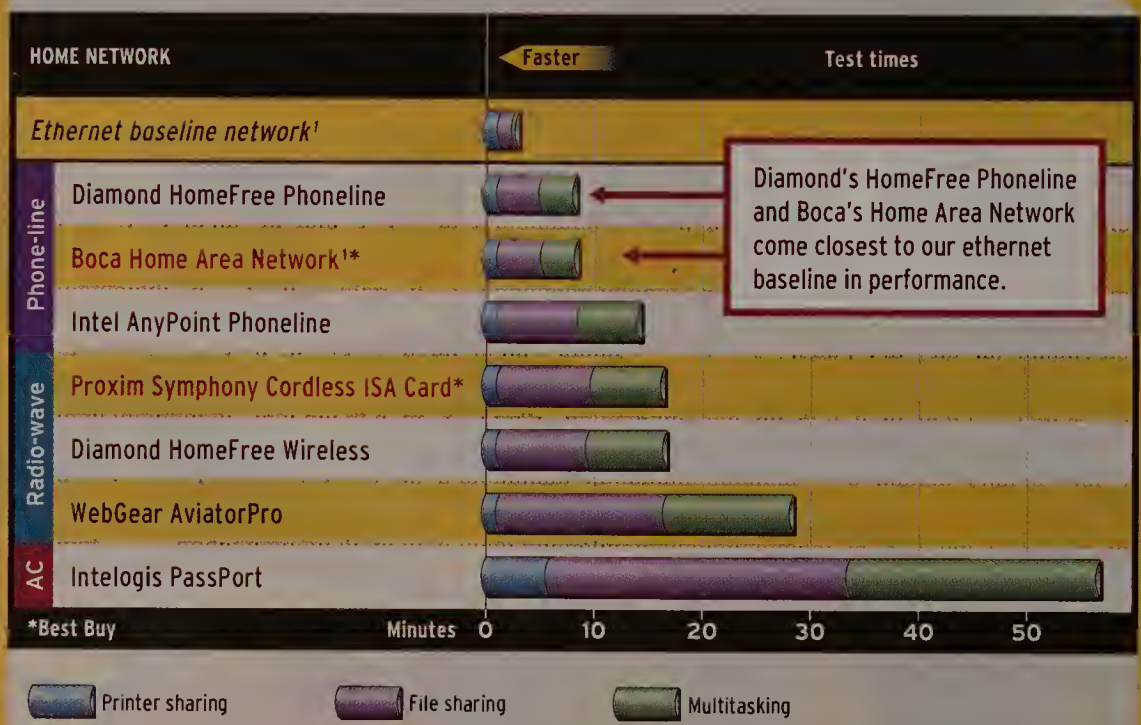
All three wireless products were straightforward to set up, but network range and performance depend largely on antenna placement. With HomeFree Wireless and AviatorPro, the antenna is fixed to the adapter card, protruding a couple of inches beyond the back of the computer, so your PC's placement determines its RF effectiveness. WebGear's antenna is hinged in one direction, making it a bit more flexible—though we found no real performance differences with various positions.

Mel Beckman (mel@becknet.com) is a freelance writer and tester based in Ventura, California. ■

TEST REPORT

Nowhere Near Ethernet

Home networking kits show speed differences of up to 90 percent.



HOW WE TEST All products tested by author in a series of timed tasks, including printing a file on a remote printer, opening a file stored on a remote PC, and copying files to and from networked PCs amidst background tasks. For more information on our tests, see www.pcworld.com/jun99/networking. Lower test times are better. ¹3Com OfficeConnect Networking Kit (four-port).

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NEW DELL DIMENSION XPS T500 PENTIUM III PROCESSOR AT 500MHz

- 128MB 100MHz SDRAM
- *NEW* 9.1GB[4] Ultra ATA Hard Drive (7200 RPM)
- 17" (16.0" vis, .26dp) 1000HS Trinitron Monitor
- 16MB Diamond Viper TNT 3D AGP Graphics Card
- 40X Max[5] Variable CD-ROM Drive
- Yamaha XG 64V Wavetable Sound
- harman/kardon HK-195 Speakers
- 100MB Iomega Zip BUILT-IN Drive
- MS Office 97 SBE plus Bookshelf (Ask about Our *FREE* MS Office 2000 Upgrade Offer); McAfee VirusScan
- MS Windows 98/IntelliMouse
- Dell QuietKey Keyboard
- 3-Year Limited Warranty[2]
- 1-Year NBD On-site[3] Service

$1999

Business Lease[15]: $67/Mo., 36 Mos.

E•VALUE CODE: 03629-590519

NEW DELL DIMENSION XPS T450 PENTIUM III PROCESSOR AT 450MHz

- 64MB 100MHz SDRAM
- *NEW* 9.1GB[4] Ultra ATA Hard Drive (7200 RPM)
- 17" (16.0" vis, .26dp) M780 Monitor
- 8MB ATI XPERT 98D 3D AGP Graphics
- 40X Max[5] Variable CD-ROM Drive
- Yamaha XG 64V Wavetable Sound
- MS Office 97 SBE plus Bookshelf (Ask about Our *FREE* MS Office 2000 Upgrade Offer); McAfee VirusScan
- MS Windows 98/IntelliMouse
- Dell QuietKey Keyboard
- 3-Year Limited Warranty[2]
- 1-Year NBD On-site[3] Service

★ *Upgrade to 96MB 100MHz SDRAM, add $59.*

★ *Upgrade to a 17" (16.0" vis, .26dp) 1000HS Trinitron Monitor, add $99.*

$1499

Business Lease[15]: $50/Mo., 36 Mos.

E•VALUE CODE: 03629-590514

Gigabuys™ for Dimension

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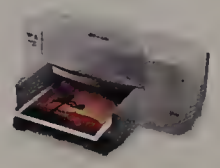

- HP® DeskJet® 882 Color Printer, add $299.
- HP DeskJet 710 All-in-One, add $499.
- HP LaserJet® 1100se Printer, add $399.
- Dragon NaturallySpeaking Preferred (Speech Recognition Software), add $149.
- 3Com Palm III, add $319.
- HP SureStore CD-Writer Plus 7200E, add $388.

DELL DIMENSION V400c INTEL® CELERON™ PROCESSOR AT 400MHz

- 64MB SDRAM
- 6.4GB[4] Ultra ATA Hard Drive
- 17" (16.0" vis, .26dp) M780 Monitor
- 8MB ATI 3D AGP Graphics
- 32X Max[6] Variable CD-ROM Drive
- Yamaha XG 64V Wavetable Sound
- harman/kardon HK-195 Speakers
- 3Com 3C905B 10/100 NIC
- MS Office 97 SBE plus Bookshelf (Ask about Our *FREE* MS Office 2000 Upgrade Offer); McAfee VirusScan
- Microsoft® Windows 98
- Dell QuietKey Keyboard
- Logitech First Mouse+ Wheel (PS/2v)
- 3-Year Limited Warranty[2]
- 1-Year NBD On-site[3] Service

★ *Upgrade to a NEW 9.1GB Ultra ATA Hard Drive (7200 RPM), add $29.*

$1299

Business Lease[15]: $44/Mo., 36 Mos.

E•VALUE CODE: 03629-590512

DELL DIMENSION V400c INTEL CELERON PROCESSOR AT 400MHz

- 32MB SDRAM
- 4.3GB[4] Ultra ATA Hard Drive
- 15" (13.8" vis) 800F Monitor
- 8MB ATI 3D AGP Graphics
- 32X Max[6] Variable CD-ROM Drive
- Integrated Intel 10/100 Ethernet Controller
- Microsoft Works Suite 99 with Money 99 Basic; McAfee VirusScan
- Microsoft Windows 98
- Dell QuietKey Keyboard
- Logitech First Mouse+ Wheel (PS/2v)
- 3-Year Limited Warranty[2]
- 1-Year NBD On-site[3] Service

★ ***Upgrade to the Small Business Solutions Bundle, add only $155.*** *NEW Dimension V433c: Intel Celeron Processor at 433MHz, 6.4GB Ultra ATA Hard Drive, MS Office 97 plus Bookshelf, McAfee VirusScan*

$999

Business Lease[15]: $33/Mo., 36 Mos.

E•VALUE CODE: 03629-590509

POWER UPGRADES

- 100MB Iomega Zip BUILT-IN Drive with Two Disks, add $99.
- 250MB Iomega Zip BUILT-IN Drive with One Disk, add $149.
- 100MB Iomega Zip Disk 6-Pak, add $63.
- 3Com 3C905B 10/100 NIC, add $49.
- 3Com USRobotics V.90[11] PCI Telephony WinModem, add $49.
- Intuit QuickBooks 99, add $118.
- Intuit QuickBooks Pro 99, add $215.
- Upgrade to Microsoft Windows NT® Workstation 4.0, add $99.
- Upgrade from Microsoft Office 97 Small Business Edition to Microsoft Office 97 Professional Edition, add $199.
- 3-Year Next-Business-Day On-site[3] Service, add $99.
- Upgrade from a 17" (16.0" vis, .26dp) M780 Monitor to a 17" (16.0" vis, .26dp) 1000HS Trinitron Monitor, add $99.

Prices valid with system purchase only.

DELL DIMENSION AWARD INFO

- In 1998, Dell Dimension desktops won more than 90 product and service awards. See www.dell.com/awards98 for details.

Advertised configurations vary from award-winning configurations.

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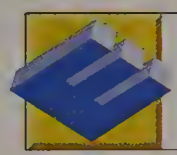

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Dell notebooks help you take your business with you wherever you go. Take our fully loaded Dell® Inspiron™ 3500 with a Pentium® II processor at up to 366MHz. Not only does it come with a bright 14.1-inch active-matrix display, it can handle just about everyone's day-to-day business while weighing in at just a shade over 6 pounds.[12] But notebooks aren't our only claim to bend-over-backwards agility. As a company, Dell is equally adept at adapting to your needs. We offer a multitude of customizing, financing and service options as well as a couple different ways to get a hold of us and start the ball rolling. Namely, by going to www.dell.com or using the phone number at the right. **800-395-5383**

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PENTIUM® II PROCESSOR AT 366MHz

Desktop Features, Notebook Convenience

- 15" XGA Active Matrix Display
- 96MB SDRAM
- *NEW* 14GB[4] Ultra ATA Hard Drive
- Removable Combo 4X[10] DVD-ROM and Floppy Drive
- 2X AGP 8MB ATI RAGE™ LT Pro 3D Video
- 3D Surround Sound with Wavetable
- Lithium Ion Battery
- 56K Capable[11] x2 Modem with Trial Offer ConnectDirect℠ Internet Access[14]
- MS® Office 97 SBE (Ask about Our *FREE* MS Office 2000 Upgrade Offer)
- Microsoft® Windows® 98/Touchpad
- APC Notebook Surge Protector
- 3-Year Limited Warranty[2]

$3799

Business Lease[15]: $127/Mo., 36 Mos.

E•VALUE CODE: 03630-890537

DELL INSPIRON 7000 A366GT
PENTIUM II PROCESSOR AT 366MHz

Desktop Features, Notebook Convenience

- 14.1" XGA Active Matrix Display
- 64MB SDRAM
- 4.3GB[4] Ultra ATA Hard Drive
- Removable Combo 24X Max[7] Variable CD-ROM and Floppy Drive
- 2X AGP 4MB ATI RAGE LT Pro 3D Video
- 3D Surround Sound with Wavetable
- Lithium Ion Battery
- 56K Capable[11] x2 Modem with Trial Offer ConnectDirect Internet Access[14]
- MS Office 97 SBE (Ask about Our *FREE* MS Office 2000 Upgrade Offer)
- *NEW* Microsoft Windows NT® Workstation 4.0/Touchpad
- 3-Year Limited Warranty[2]

$2799

Business Lease[15]: $90/Mo., 36 Mos.

E•VALUE CODE: 03630-890527

NEW DELL INSPIRON 7000 A300LT
PENTIUM II PROCESSOR AT 300PE MHz

Desktop Features, Notebook Convenience

- 15" XGA Active Matrix Display
- 32MB SDRAM
- 4.3GB[4] Ultra ATA Hard Drive
- Removable Combo 24X Max[7] Variable CD-ROM and Floppy Drive
- 2X AGP 4MB ATI RAGE LT Pro 3D Video
- 3D Surround Sound with Wavetable
- Lithium Ion Battery
- MS Office 97 SBE (Ask about Our *FREE* MS Office 2000 Upgrade Offer)
- Microsoft Windows 98/Touchpad
- 3-Year Limited Warranty[2]

★ *56K Capable[11] Gold Card Global Modem, add $139.*

$2399

Business Lease[15]: $80/Mo., 36 Mos.

E•VALUE CODE: 03630-890523

DELL INSPIRON 3500 A300GT
PENTIUM II PROCESSOR AT 300PE MHz

Light Weight, Light Price

- 14.1" XGA Active Matrix Display
- 32MB SDRAM
- 4.3GB[4] Ultra ATA Hard Drive
- Modular 24X Max[7] Variable CD-ROM
- NeoMagic® 256AV AGP Video
- 3D Surround Sound with Wavetable
- Lithium Ion Battery
- Microsoft Works Suite 99 with Money 99 Basic
- Microsoft Windows 98/Touchpad
- 3-Year Limited Warranty[2]

★ *3-Year NBD On-site[3] Service, add $99.*

★ *Upgrade to 64MB SDRAM, add $99.*

$1999

Business Lease[15]: $67/Mo., 36 Mos.

E•VALUE CODE: 03630-890519

NEW DELL INSPIRON 3500 C333XT
INTEL® CELERON™ PROCESSOR AT 333MHz

Light Weight, Light Price

- 13.3" XGA Active Matrix Display
- 32MB SDRAM
- 4.3GB[4] Ultra ATA Hard Drive
- Modular 24X Max[7] Variable CD-ROM
- NeoMagic 256AV AGP Video
- 3D Surround Sound with Wavetable
- Lithium Ion Battery
- Microsoft Works Suite 99 with Money 99 Basic
- Microsoft Windows 98/Touchpad
- 3-Year Limited Warranty[2]

★ *3Com® 10/100 Fast Ethernet Adapter, add $129.*

$1799

Business Lease[15]: $60/Mo., 36 Mos.

E•VALUE CODE: 03630-890517

DELL LATITUDE® CPi A366XT
SMALL BUSINESS SOLUTION
PENTIUM II PROCESSOR AT 366MHz

Network-Optimized Notebook

- 13.3" XGA Active Matrix Display
- 96MB SDRAM (256MB Max)
- 4.3GB[4] Ultra ATA Hard Drive
- Modular 24X Max[7] Variable CD-ROM
- Modular Floppy Drive
- NeoMagic 256AV AGP Video
- 3D Surround Sound with Wavetable
- Lithium Ion Battery
- MS Office 97 SBE (Ask about Our *FREE* MS Office 2000 Upgrade Offer)
- MS Windows NT Workstation 4.0/Touchpad
- 3-Year Limited Warranty[2]
- Deluxe Nylon Case

$3199

Business Lease[15]: $107/Mo., 36 Mos.

E•VALUE CODE: 03630-790531

DELL LATITUDE CPi A300ST
PENTIUM II PROCESSOR AT 300PE MHz

Network-Optimized Notebook

- 12.1" SVGA Active Matrix Display
- 64MB EDO RAM (256MB Max)
- 4.3GB[4] Ultra ATA Hard Drive
- Modular 24X Max[7] Variable CD-ROM
- Modular Floppy Drive
- NeoMagic 256AV AGP Video
- 3D Surround Sound with Wavetable
- Lithium Ion Battery
- MS Windows NT Workstation 4.0/Touchpad
- 3-Year Limited Warranty[2]
- 1-Year NBD On-site[3] Service

★ *Upgrade to 96MB EDO RAM, add $99.*

$2399

Business Lease[15]: $80/Mo., 36 Mos.

E•VALUE CODE: 03630-790523

DELL NOTEBOOK AWARD INFO

- Inspiron 7000 A366LT – *PC Magazine's* Editors' Choice for small businesses, 1/99.
- Inspiron 3500 C300XT – *PC World's* Best Buy in the budget category, 4/99.

Advertised configurations vary from award-winning configurations.

Gigabuys™ for Notebooks

Available at Dell.com. More products at great prices!

- *NEW* 100MB Zip Internal Drive for Latitude CP & CPi (Win95/98), add $199.
- Notebook Conversion Package, including Black ViewSonic 17" (16.0" viewable) Multimedia Monitor, ErgoMouse and Keyboard, add $429.
- HP® DeskJet® 882 Color Printer, add $299.
- Canon BJC-50 Portable Printer, add $349.

intel inside pentium® II PROCESSOR

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DELL® POWEREDGE® 6300 SERVER
PENTIUM® III XEON™ PROCESSOR AT 500MHz
(QUAD PROCESSOR CAPABLE)

- **256MB ECC EDO RAM**
- **Three 9GB[4] (10,000 RPM) Ultra-2/LVD SCSI Hot-Swap Hard Drives**
- **Ultra-2/LVD PowerEdge Expandable RAID Controller 2 with 128MB Cache**
- HP® OpenView™ NNM Special Edition
- Two Intel® Pro/100+ PCI Ethernet Adapters with Adaptive Fault Tolerance Software
- Integrated Dual Ultra-2/LVD and Ultra/Narrow SCSI Controllers
- **Redundant Hot-Swap Power Supplies, Cooling Fans and Processor Fans**
- 7 Expansion Slots: (4) 64-bit, (3) 32-bit PCI
- 8-1" Hard Drive Bays/4-5.25" Media Bays
- **3-Year NBD On-site[3] Service**
- **1-Year DirectLine℠ NOS Support**
- 7x24 Dedicated Server Hardware Technical Telephone Support

$12,549

Business Lease[15]: $414/Mo., 36 Mos.

E•VALUE CODE: 03631-290501

DELL POWEREDGE 4300 SERVER
PENTIUM II PROCESSOR AT 400MHz
(DUAL PROCESSOR/RAID CAPABLE)

- **256MB 100MHz ECC SDRAM**
- **9GB[4] Ultra-2/LVD SCSI Hard Drive (Hot-Swap Optional)**
- HP OpenView NNM Special Edition
- Two Intel Pro/100+ PCI Ethernet Adapters with Adaptive Fault Tolerance Software
- Integrated Ultra-2/LVD and Ultra/Narrow SCSI Controllers
- **Redundant Hot-Swap Power Supplies, Cooling Fans and Processor Fans**
- **12/24GB Variable SCSI DAT Tape Backup Unit**
- 6 Expansion Slots: 4 PCI, 2 PCI/ISA
- 6-1.6" Hard Drive Bays/4-5.25" Media Bays
- **3-Year NBD On-site[3] Service**
- **1-Year DirectLine NOS Support**
- 7x24 Dedicated Server Hardware Telephone Technical Support

$5949

Business Lease[15]: $199/Mo., 36 Mos.

E•VALUE CODE: 03631-290559

DELL POWEREDGE 2300 SERVER
NEW PENTIUM III PROCESSOR AT 500MHz
(RAID 5 CONFIGURATION)

- **256MB 100MHz ECC SDRAM**
- **Three 9GB[4] Ultra-2/LVD SCSI Hot-Swap Hard Drives**
- **Ultra-2/LVD PowerEdge Expandable RAID Controller 2/Single-Channel**
- HP OpenView NNM Special Edition
- Intel Pro/100+ PCI Ethernet Adapter
- Integrated Ultra-2/LVD and Ultra/Narrow SCSI Controllers
- 6 Expansion Slots: 4 PCI, 2 PCI/ISA
- 6-1" Hard Drive Bays
- 4 Media Bays: 3-5.25", 1-3.5"
- **3-Year NBD On-site[3] Service**
- 7x24 Dedicated Server Hardware Telephone Technical Support
- ★ *APC Smart-UPS 700W Power Supply, add $369.*

$5499

Business Lease[15]: $184/Mo., 36 Mos.

E•VALUE CODE: 03631-290554

DELL POWEREDGE 2300 SERVER
NEW PENTIUM III PROCESSOR AT 450MHz
(DUAL PROCESSOR/RAID CAPABLE)

- **128MB 100MHz ECC SDRAM**
- **9GB[4] Ultra-2/LVD SCSI Hard Drive (Hot-Swap Optional)**
- **Microsoft® Windows NT® Server 4.0 (10 Client Access Licenses)**
- HP OpenView NNM Special Edition
- Intel Pro/100+ PCI Ethernet Adapter
- Integrated Ultra-2/LVD and Ultra/Narrow SCSI Controllers
- 6 Expansion Slots: 4 PCI, 2 PCI/ISA
- 4-1.6" or 6-1" Hard Drive Bays
- 4 Media Bays: 3-5.25", 1-3.5"
- **3-Year NBD On-site[3] Service**
- 7x24 Dedicated Server Hardware Technical Telephone Support
- ★ *12/24GB Variable SCSI DAT Tape Backup Unit, add $749.*

$3799

Business Lease[15]: $127/Mo., 36 Mos.

E•VALUE CODE: 03631-290537

DELL POWEREDGE 2300 SERVER
PENTIUM II PROCESSOR AT 400MHz
(DUAL PROCESSOR/RAID CAPABLE)

- **64MB 100MHz ECC SDRAM**
- **4GB[4] Ultra-2/LVD SCSI Hard Drive (Hot-Swap Optional)**
- HP OpenView NNM Special Edition
- Intel Pro/100+ PCI Ethernet Adapter
- Integrated Ultra-2/LVD and Ultra/Narrow SCSI Controllers
- 6 Expansion Slots: 4 PCI, 2 PCI/ISA
- 4-1.6" or 6-1" Hard Drive Bays
- 4 Media Bays: 3-5.25", 1-3.5"
- **3-Year NBD On-site[3] Service**
- 7x24 Dedicated Server Hardware Technical Telephone Support
- ★ *MS® Windows NT Server 4.0 (10 Client Access Licenses), add $799.*
- ★ *Upgrade to a Pentium III Processor at 450MHz, add $300.*

$2349

Business Lease[15]: $79/Mo., 36 Mos.

E•VALUE CODE: 03631-290523

NEW DELL POWEREDGE 1300 SERVER
PENTIUM II PROCESSOR AT 400MHz
(DUAL PROCESSOR/RAID CAPABLE)

- **64MB 100MHz ECC SDRAM**
- **4GB[4] Ultra-2/LVD SCSI Hard Drive**
- HP OpenView NNM Special Edition
- Intel Pro/100+ PCI Ethernet Adapter
- Integrated PCI Ultra-2/LVD SCSI Controller
- 6 Expansion Slots: 5 PCI, 1 PCI/ISA
- 4 Hard Drive Bays: 2-1.6" and 2-1"
- 3-5.25" Media Bays
- **3-Year NBD On-site[3] Service**
- 7x24 Dedicated Server Hardware Technical Telephone Support
- ★ *Upgrade to a 9GB Ultra-2/LVD SCSI Hard Drive, add $200.*
- ★ *Upgrade to 128MB 100MHz ECC SDRAM, add $122.*

$1849

Business Lease[15]: $62/Mo., 36 Mos.

E•VALUE CODE: 03631-290518

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- Network Cabling Installation
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Must purchase a PowerEdge server to be eligible for installation services

DELL SERVER AWARD INFO

- *Network World* "World Class Award" – Dell PowerEdge 2300, 6/98.
- *Computer Shopper* "Top 100" – Dell PowerEdge 2300, 11/98.
- *PC Computing*'s "The 'A' List" – Dell PowerEdge 6300, 11/98.
- *LANTimes* "The Best of *LANTimes* Over $25,000"– Dell PowerEdge 6300, 9/98.
- *ComputerWorld*'s "Leaders' Choice" Winner Workgroup Servers – Dell PowerEdge Family, 1/98.

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- 3-Year Limited Warranty[2]
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Business Lease[15]: $74/Mo., 36 Mos.

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1 component selection may require changes to other system options. Ple

NEW Dimension® XPS T500 Mini Tower
Pentium® III Processor, at 500MHz with 512KB L2 Cache

Memory: 128MB 100MHz SDRAM

Hard Drive — HELP ME CHOOSE: NEW 9.1GB Ultra ATA Hard Drive (7200 RPM)

Monitor — HELP ME CHOOSE: 17" (16.0" viewable, .26dp) M780 Monitor

Video Card — HELP ME CHOOSE: 8MB ATI 3D AGP Graphics

Please review the following regarding your Video Selection:
- Not available on the 4.8X DVD with Software Decoding

DVD-ROM or CD-ROM Drive — HELP ME CHOOSE: 40X Max Variable CD-ROM Drive

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Booking Travel on the Web with Reservations

BY JAMES A. MARTIN

Popular sites like MSN Expedia and Travelocity.com trumpet great deals, but should you ditch your trusty travel agent?

ILLUSTRATIONS BY EDWIN FOTHERINGHAM

It was a freezing March day, and I was en route from San Francisco to New York. Or so I thought.

My travel agent connected me through Chicago to save money. But with only 30 minutes to change planes, my inbound flight arrived late. I sprinted through O'Hare, reaching the gate just in time to see my plane taxi away. I tried to finagle a standby seat on the next few flights—no dice. Finally, I checked in to the Itchy and Scratchy Airport Lodge, buried my toes in lime-green shag carpeting, and hopped on a plane the next morning.

That misadventure occurred pre-Web, before mere mortals like me had updated airline schedules and fares at our fingertips. Now that we do, I got to thinking: Could I have done a better job than my agent?

To find out, I devised two San Francisco–New York round-trip scenarios and looked for flights at the nine most-visited Web travel sites. Then I put two travel agents to work on the same itineraries, to see if a live agent could beat the Web.

In the first experiment, I played a big-shot executive, desperate to get to New York within three business days. In this role, I had little time to Web surf, my travel schedule was fixed, and money wasn't my main concern. The goal: To get the flights I needed, quickly and efficiently.

For my second test, I impersonated a low-budget drone in a pre-IPO Silicon Valley start-up who needed to go to New York in about 30 days. I was flexible: I could spend hours online comparing prices (on company time, of course), take a red-eye flight, stay over Saturday night, and spend my weekend working. The objective: To find the lowest fare.

In the end, the freedom and convenience of the Web sites appealed to my beleaguered corporate side, while my inner cheapskate loved the way they offered to send me low-fare information via e-mail. Nonetheless, the travel agents did a good job finding low fares and convenient itineraries, and when it comes to creative thinking, agents still rule. But why treat this as an either/or choice? A good agent *and* the best travel sites make an unbeatable combination.

I started by making multiple visits over several weeks to nine heavily trafficked travel sites—Atevo, Biztravel.com, Flifo, Internet Travel Network, MSN Expedia, Preview Travel, Reservation Desk at CNN.com, TheTrip.com, and Travelocity.com. I wanted to see how easy they were to use. Then, because fares fluctuate, I visited all nine sites on the same day to confirm my short-notice flight *and* my plan-ahead cheap flight.

That same day, I put the two travel agents—no-nonsense Phyllis at American Express and sweet-natured Gina at a San Francisco mom-and-pop shop—to work on my trips.

MSN Expedia emerged as the best site for both scenarios, with Biztravel.com a close second for time-starved business execs. Expedia's streamlined interface made it easy to use, and it dug up some great airfares. But Expedia shares some shortcomings with its competitors. For instance, I often had difficulty getting it to plan a trip around a cheap fare—that is, to find the lowest available fare between two cities and then design an itinerary (time, date, and flight) around it. To accomplish that with a travel agent, just ask.

Just the Ticket?

BOOKING TRAVEL online is a snap. Whether you want the cheapest fare or need to fly pronto (and have the funds to do it), we've got your ticket. Here are the best and worst sites for getting where you want to go.

CHEAP FARES

Flying High: Expedia did the best bargain-sniffing. Its Fare Compare tool is a great place to start comparing—though I could not always find the low fares listed, and a resourceful agent can beat it occasionally.

Grounded: Atevo (and three others) found the highest short-notice fare. Plus, it has nothing like Expedia's Fare Compare tool and no e-mail notification of low airfares.

QUICK ITINERARIES

Flying High: Only Expedia lets you start planning a trip on the home page and get the results of your search on the next. It also gets you your tickets speedily and lets you book hotel rooms and cars conveniently.

Grounded: Atevo and TheTrip.com don't let you get to work on your itinerary until you're four pages into the sites—and neither makes changing your itinerary easy.

TRAVEL SITES

SITE	Ease of use: Navigation	Creating passenger profile	Quickly creating an itinerary	Changing itineraries before ticketing	Finding low fares	Booking air, hotel, and car at once
Atevo www.atevo.com	fair	good	poor	fair	poor	good
Biztravel.com www.biztravel.com	very good	excellent	very good	very good	good	excellent
Flifo www.flifo.com	poor	good	fair	very good	fair	very good
Internet Travel Network www.itn.net	fair	good	fair	poor	fair	good
MSN Expedia* expedia.msn.com	excellent	very good	excellent	very good	excellent	very good
Preview Travel www.previewtravel.com	very good	very good	very good	poor	good	good
Reservation Desk at CNN.com www.cnn.com/travel	good	good	good	fair	fair	good
TheTrip.com www.thetrip.com	good	very good	poor	fair	good	good
Travelocity.com www.travelocity.com	very good	good	very good	good	good	good

* Recommended ● Yes ○ No

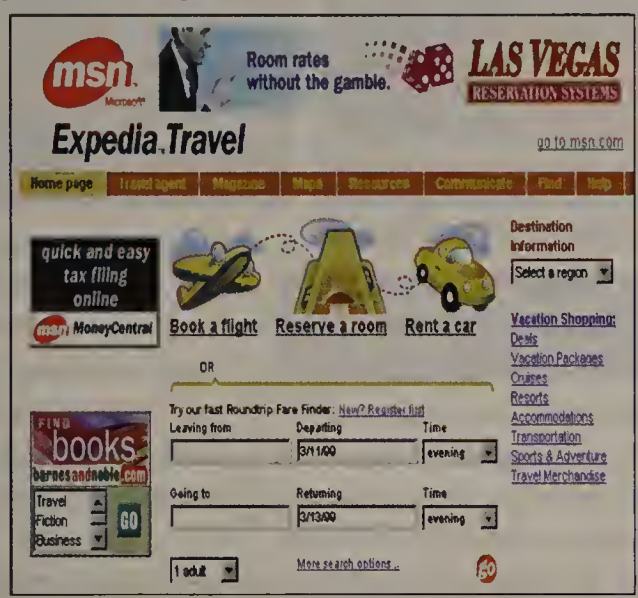
Quick Planning

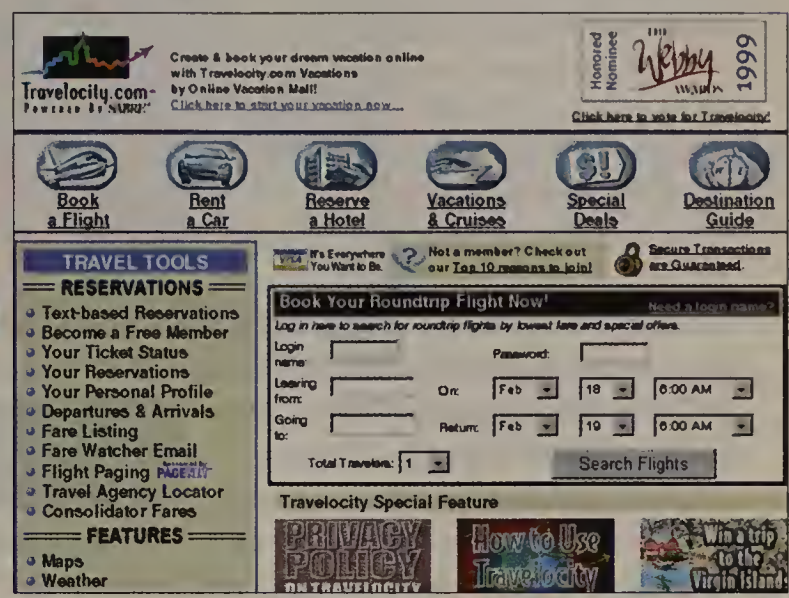
Why would busy executives go online to research or buy a ticket when a travel agent can do the job for them? Two reasons: convenience and control, explains Eric Siegel, a major account manager for Cisco Systems' security and management division. "Instead of spending time with our corporate travel agent during a busy workday," Siegel says, "I can go online at night, find the itinerary I want, then ask the agent to charge the ticket to the company. I like to be in control of my schedule and know what my travel options are, and the Web gives me a convenient way to do that."

As Mr. Too-Busy-to-Be-Bothered Executive, I of course had no desire to wade through multiple Web pages to get where I wanted to go. Expedia came through with search results one page down from the home page (after I registered and got the three-letter airport codes from my airline). The other sites forced me to view at least one additional page before displaying my flight options. With Atevo and TheTrip.com, the worst offenders, I had to surf through four pages before I could even start researching an itinerary.

Depending on my needs, I like my search results packaged in different ways. When I must follow a specific timetable, I prefer to view individual flight segments so I can select the exact flight legs I want before I see the fare. But when I just want to get from point A to point B, I want to see round-trip itineraries with complete fares. Expedia, Preview Travel, Travelocity, and Biztravel.com all let you choose between these two ways of sorting results; the rest of the sites only list flight segments individually.

When I travel, I like to know in advance where I'll sit. For that, I turn to ▶





MSN EXPEDIA AND TRAVELOCITY.COM both let you start your planning on their home pages.

FEATURES COMPARISON

Managing frequent flier mileage	Provides local info	Graphical seat selection	Low-fare notification by e-mail	Comments
fair	●	●	○	**OVERCROWDED.** Busy interface makes planning slow, and hotel and car reservations integrate poorly with airline itineraries. Still, travel news, advice, and destination information are worth a look.
excellent	●	●	○	**FRIENDLY SKIES.** Packed with useful information and great at helping you manage your miles, but not as easy to use or as good at finding cheap fares as MSN Expedia.
fair	○	○	○	**CARGO CLASS.** No-frills wouldn't be bad if this site didn't look so amateurish. Plus, Flifo slows you down because it doesn't provide airfares or availability with its initial search results.
good	●	●	●	**ROUGH WEATHER.** The good: a useful interactive calendar, the best graphical seat selection, and top-notch e-mail low-fare notification. The bad and the ugly: less-than-helpful Low Fare Ticker.
very good	●	●	●	**TOPFLIGHT.** Fast, efficient, jammed with extras (like an online travel magazine), and best at finding low fares. Downer: You can't always apply the fares to actual itineraries.
good	●	○	●	**FLIGHT DELAYS.** It looks good and offers great online help, links to Fodor's city guides, and the best multimedia content. The big minus: Performance is consistently sluggish.
good	●	●	●	**COACH.** We liked some things: travel news, Air Deals at a Glance feature, and ability to search for a flight without a log-in. Too bad you have to combine flight segments to see the round-trip fare.
good	●	●	●	**BUSINESS CLASS.** This business-focused site features a cool interactive flight tracker and Fare Aware averaging tool. Unfortunately, changing a trip is difficult, and annoying banner ads make viewing your itinerary awkward.
good	●	●	●	**PLUSH.** Handsome, full-featured, and easy to use (you can start planning a trip from the home page), but performance tends to be slow.

All sites tested on a Dell Dimension XPS D300 Pentium II-300 PC with 96MB of RAM, an 8GB hard drive, and a 56-kbps U.S. Robotics modem using a dial-up Internet connection.

the seat-selection options found on many travel sites. Internet Travel Network and the sites that use its reservation systems (Atevo, CNN, and Thetrip.com) offer the coolest feature: View a graphic of the cabin, see which seats are available, and click on a seat to reserve it. Unfortunately, the graphic won't show which prospective seatmates are inordinately chatty. At the other end of the spectrum, Preview Travel and Flifo simply submit the seat preferences in your travel profile to the airline, which then makes its assignment based on that preference (and on seats' availability).

As a Grand Poobah, I take perverse pleasure in changing my travel plans on a whim—and a good site lets me do just that. In Expedia, I merely click a couple of buttons in my itinerary and I'm back in the Flight Wizard, where I can make changes at will. At Biztravel.com, a yellow Change Trip tab at the top of the page takes me to my itinerary. (Of course, a good travel agent manages this feat just as adroitly.) In contrast, revising an itinerary on the ITN sites was a hassle. The Modify button next to each of the flight segments took me back to the very beginning of the travel planning process—and occasionally the button didn't work at all.

ATEVO uses the ITN Java Seat Mapper, which lets you click a cabin seat to reserve it.

IS THAT Ticker—or Tricker? Just try finding one of the tempting fares that flash on the Internet Travel Network's Java-based utility.

Because I'm so important, my plans might change after I pay for my ticket. But changing a ticket at that point is not always easy. Kudos then to Biztravel.com, Expedia, ITN, and TheTrip.com: Unlike the other sites, they let me make changes by calling live travel agents via a toll-free number. This is one area where a travel agent can trump the Web—see "The Personal Touch."

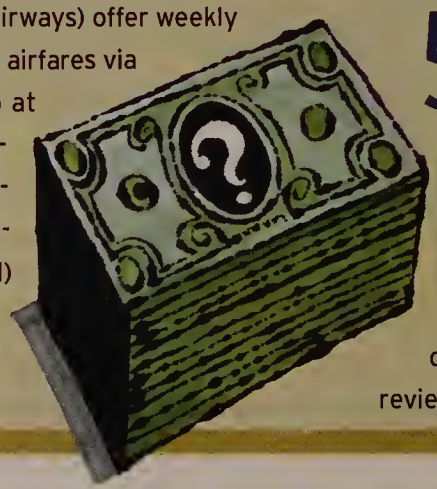
It's not enough for a busy muck-a-muck to order a ticket

Sites for Sights

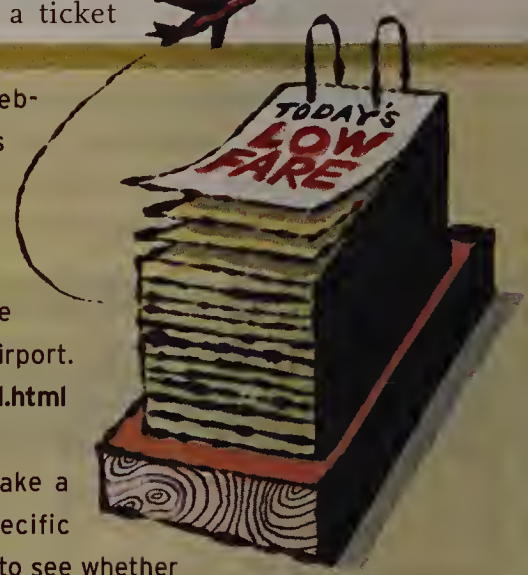
EVALUATING travel resources on the Web is like trying to find my black rolling suitcase on the baggage carousel: a search for subtle variation. Still, having viewed an unspeakable number of sites, I've found the brightest of the bunch—services offering whip-smart ways to use the Web for business or personal travel. Just book your trip and pack—oh, and don't forget to put name tags on your suitcases.

1. **Name your price.** Want to fly round-trip from New York to Singapore for $25? At Priceline.com, you name what you're willing to pay for the flight or lodging. If an airline or hotel agrees to your price, you're on your way. Hint: You may not find a trip to the land of no graffiti for $25, but you might for $250. **tickets.priceline.com**

2. **Stay up to date.** Many well-known airlines (among them American, Delta, United, US Airways) offer weekly last-minute round-trip bargain airfares via an automatic e-mail. You can sign up at each airline's site or, even better, subscribe to several airlines' e-mail notification programs simultaneously via Epicurious's useful (albeit irregularly updated) All-in-One Signup list. **www.travel.epicurious.com/travel/a_homepage/planning.html**



3. **Watch for deals.** WebFlyer's Deal Watch puts airline and hotel deals in one place. Click on the alphabetical group for your home city, and scroll to the list of airfare specials departing from that airport. **www.webflyer.com/@deal/@deal.html**



4. **Buy wholesale.** Make a reservation for a specific itinerary, then check to see whether Airline Tickets WholeSale, an airline consolidator, can get you a better deal—up to $150 off fares over $300 within the 48 contiguous United States. **www.traveldiscounters.com**

5. **Fly for free.** WebFlyer is chock-full of news, reviews, and tools for tracking frequent-flier programs. Check your accumulated mileage and get side-by-side comparisons of over 40 airline programs. **www.insideflyer.com**

6. **Find a home-away-from-home.** Fodor's Hotel Index stands out when you want an inn that suits your tastes. Select a destination, check off search criteria (such as price range and neighborhood), and you'll get reviews from Fodor's guidebooks. TravelWeb itemizes thousands of

quickly—I've got to receive it PDQ, too. Biztravel.com goes the extra mile here—tickets purchased before 5 p.m. EST arrive the next business day. Other sites, at my request, helpfully delivered my ticket to a location other than my credit-card address or let me choose between paper and e-tickets. ITN and its partner sites had the most restrictive ticketing options: Using different addresses for billing and ticketing is verboten.

After ordering peons around all day, I need a place to rest my head. Every travel site let me search for and book both a hotel room and a rental car. Biztravel.com rolls out the red carpet: I can book flight, hotel, and car at once—faster than at any other site. Expedia's Hotel Wizard is a breeze to use: It let me search by price range, chain name, location, or amenities, and then mapped locations.

But none of the sites excelled at booking a room because in every case their options were limited. In Expedia, for instance, I chose 'in or around a city' and specified New York, but the results included hotels in distant New Jersey suburbs. On top of that, the travel sites list chain hotels primarily, whereas I'm a suit who prefers small, quirky spots like Manhattan's Morgans Hotel. Worst of all, none of the sites let me search for hotels that have an espresso bar—and you don't want to be around me if I haven't had my morning double latté yet. As for rental cars, Travelocity offered the greatest number of search options, such as convertibles and in-car navigation systems.

So is it worth a frenzied exec's time to book online? I'd say yes, with qualifications: Use Expedia or Biztravel.com, the best travel sites overall; know when and where you're going; and be flexible about staying in a chain hotel. If my itinerary were especially complicated (read: time-consuming), then I'd call an agent. ▶

SEAT-POCKET POINTERS

Where to Search

ARE THOSE SKY-HIGH, last-minute ticket prices called "business fares" because the airlines give you the business? For a recent impromptu trip, the quoted price was $1999. On the Web through the United Airlines E-fares message: $299. Also try the airline sites (see a limited list at right). Many airlines offer cheap fares for unsold seats. For hotels, visit Hotel Discounts (www.hoteldiscounts.com), run by the Web's largest hotel room consolidator. Like airlines, major chains such as Hilton (www.hilton.com) and Holiday Inn (www.basshotels.com) offer late specials for selected cities at their Web sites. —Michael S. Lasky

American Net SAAvers
www.americanairlines.com

Continental CO.O.L Travel Specials
www.flycontinental.com

Delta (Special Offers)
www.delta-air.com

Northwest CyberSavers
www.northwestairlines.com

TWA Hot Deals
www.twa.com

United E-fares
www.ual.com

US Airways E-Savers
www.usair.com

chain and independent hotels, many listings accompanied by color photos (but no reviews). **www.fodors.com/hi.cgi; www.travelweb.com**

7. **Check out what's happening in town.** I hate it when I get to a city and find the play I'd love to catch just sold out. Alternative weekly newspapers preview what's shaking, and Atlanta's Creative Loafing has links to weeklies in major U.S. cities. **www.creativeloafing.com/best/bestof.html**

8. **Preview coming attractions.** All the world's a Truman show—and if you don't believe it, point your browser to EarthCam. The site has links to live cams around the globe so you can, for instance, watch the sun set on the British Empire (oops, never mind; that happened already). **www.earthcam.com**

9. **Convert currencies.** Estonian kroons, Mauritanian ouguiyas. Who can keep 'em straight? The Oanda converter calculates how much a buck is worth in 164 foreign currencies and generates a conversion cheat sheet that you can take with you. **www.oanda.com/cgi-bin/ncc**

10. **Find a travel agent.** At the American Society of Travel Agents' site, you can actually use the Web to hunt down a representative of that endangered species, Agentus travelus. What will they think of next? **www.astanet.com**

11. **Get the big picture.** Guidebook publisher Lonely Planet presents a useful, opinionated collection of travel links called SubWWWay—a good point of departure for trip planning. **www.lonelyplanet.com/weblinks/weblinks.htm**

12. **Get a big idea.** Need some warm sand between your toes but unsure where to go? Condé Nast Traveler's Concierge helps you sniff out the beach destination or resort that best matches your needs. **www.travel.epicurious.com/concierge/concierge.html**

13. **Get practical.** For pragmatic advice, see Top 10 Travel Tips at Traveler.Net. My favorite: "Consider the night before you leave to be the actual start of your vacation." Amen, brother. **www.traveler.net/top10**

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Bargain Shopping

When I trade my pricey suit for sweatpants, I'm suddenly desperate to unearth cheap flights. But I've always assumed an agent could find lower fares than the Web. "It's a trust issue," says Michele Hentges, marketing vice president for ChannelWorks, a sales channel consultancy in Mountain View, California. "I'm Web-savvy, but flights are costly, and I'm not sure I can rely on the Web for the best prices."

Travel sites try to boost confidence in their results with cost-comparison tools. Expedia's Fare Compare promises fast rock-bottom fares, but I often couldn't apply those low fares to an actual Expedia itinerary—which is, after all, the point. For instance, I dredged up a $198 round-trip SF-to-NY fare on American Trans Air—but ATA isn't included in Expedia's reservations system. To get that fare, I'd have to call ATA or a travel agent directly.

On the flip side, Preview Travel's similar Fare Finder tool worked to perfection within its limits: It discovered a $304 SF-to-NY fare, showed me an itinerary for that fare, and then found the flights. Its limits? Because I'd seen the $198 fare at Expedia, I knew cheaper fares existed.

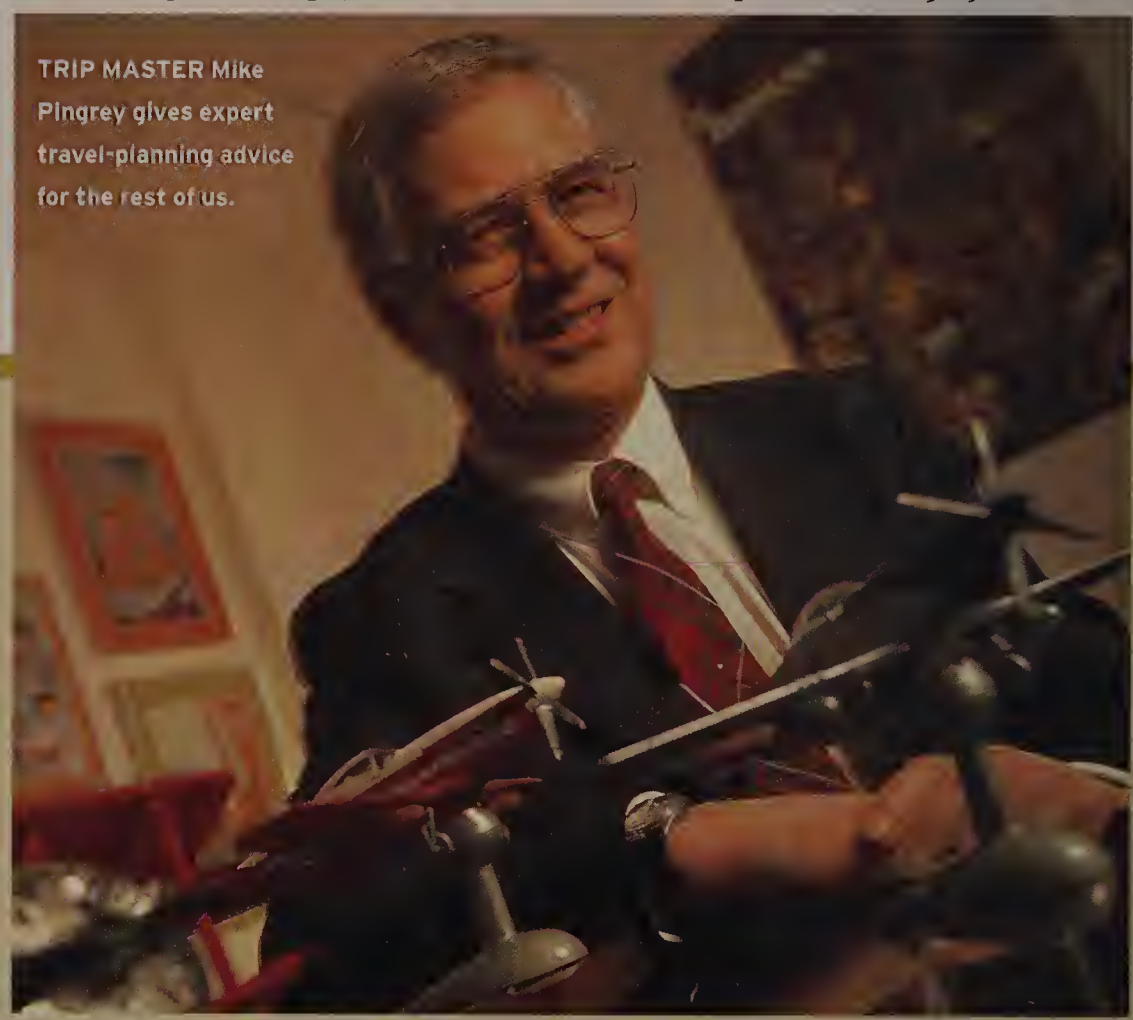
The Travelocity Best Fare Finder—which should be working by the time you read this—will let users choose an itinerary and then will display the lowest fares for the trip and a calendar highlighting dates that satisfy that fare's restrictions. Though I couldn't test this tool, it sounds like a boon to penny-pinchers like me.

The award for most useless fare-watching feature goes to ITN's Fare Ticker, which might more aptly be named Fare Tricker. It's a Java applet that flashes low round-trip fares in a tiny browser window, but it doesn't always work. I tried finding fares displayed on the ticker—to no avail. For example, when a $192.50 SF-to- ▶

SEAT-POCKET POINTERS

When to Plan

WANT TO FIND a great travel bargain on the Web? Don't plan ahead. With airfares, some of the cheapest tickets are offered close to travel time—specifically, on Wednesdays for domestic travel the following weekend, and on Mondays for international trips departing Wednesday and Thursday of that week. You can avoid a scavenger hunt on the Web by subscribing to the major airlines' e-mail alert lists, which update you the day the fares are offered. With hotel and car rentals, however, book in advance. —Michael S. Lasky



TRIP MASTER Mike Pingrey gives expert travel-planning advice for the rest of us.

PHOTOGRAPH: MANUELLO PAGANELLI

The Personal Touch

WHAT CAN agents offer that the Web can't? Lots. For the real deal, we spoke to an insider—Mike Pingrey, general manager of ACT Travel in Washington, D.C., and a spokesman for the American Society of Travel Agents.

Refunds on nonrefundable tickets. "Once a week," explains Pingrey, "we report all airline ticket transactions to the Airlines Reporting Corporation. If we haven't yet reported a ticket to the ARC, we can void it"—and your credit card will be credited back.

Creative thinking. An example: "If you're trying to get the cheapest fare from Boston to Los Angeles, a Web site won't know to check flights to Las Vegas. A savvy agent knows it might cost less to fly to Vegas, rent a car, and drive to L.A."

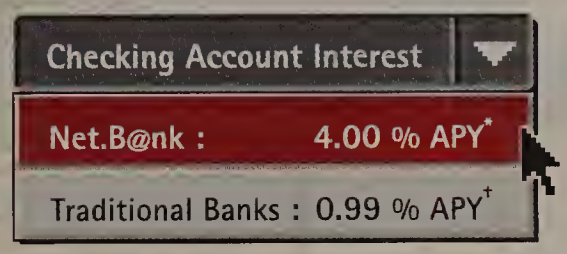
Detailed, real-time information. Agents use a computerized reservation system, which Pingrey and others agree is slightly more comprehensive and real-time than its Web counterparts. Some agents (including ACT Travel) also subscribe to Bargain Finder Plus, a $200-a-month service that digs through the CRS for the lowest fares.

Service. ACT Travel charges $25 to book a domestic flight—more than most agencies. "But the level of service we provide is worth it," Pingrey says. "We courier tickets for free, right away. We can spend hours searching for the best hotel. An agent can sometimes book a room in a supposedly full hotel. As long as we can surf the Web as well as our clients can, the Web has no advantage over us."

Traditional Bank Expense # 362		
Refillable ballpoint pens		25 x $ 7.95
		$ 198.75
Branches	X	2,800
		$ 556,500.00

OUR SECRET TO HIGHER INTEREST RATES?

NO PENS.



The math is simple – more expenses mean less return for customers. At Net.B@nk, we have the advantage of almost no overhead. Better for you because you get up to four times the interest on your checking account. And because Net.B@nk lives on the Internet, our full line of banking and financial services are at your command anywhere, anytime you go online. What, exactly, does "full line" mean? Check it out for yourself at www.netbank.com.

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Newark fare on Continental Airlines flashed on the ticker, I clicked it, bringing ITN's Simple Air Search planner up with dates and times. But when I priced that itinerary, I got a $304 fare. I called Continental, but the rep told me he had no $192.50 fare.

(Dan Whaley, cofounder of ITN and vice president of product marketing, says the Fare Ticker shows the lowest fares other users booked in the last three days, "regardless of availability." ITN is trying to shorten the time window, improve accuracy, and add a disclaimer.)

THETRIP.COM'S flight tracker displays the plane's progress using animation on a map.

The Web does rule on one feature: Sites can e-mail me about cheap flights. (Live agents don't have time.) My favorite: ITN's Fare Mail. I tell it my originating city, top destinations, and budget, and I get mail whenever a fare to those cities matches.

CHEAPEST OF THE CHEAP

I PUT THE WEB and my agents to work on a simple trip—planned a month in advance and including a Saturday stay. Nearly every site found a $304 fare, yet the agents quoted $324. So I had the agents hunt further while I went online. Expedia found the lowest fare—$198—but I couldn't book it. Meanwhile, Phyllis at American Express found a $218 ticket. "It doesn't get any cheaper unless we shoot you out of a cannon," she quipped. Gina at the mom-and-pop agency found a $270 fare. Since saving money was my goal and the agents found fares I could buy, Phyllis and Gina beat the Web.

To be doubly sure, I sicced the sites and agents on my rushed SF-to-NY itinerary, with three days notice and no weekend stay. The contest ended in a draw: Both Expedia and Phyllis found $457 round-trips—the lowest fares for that schedule, and far below the $1909 rate three of the ITN sites (and Flifo) found.

As a discount doyen, I'm at my stingy best when I sniff for bargains online and check the results with a savvy agent. When I do go online, I start my treasure hunting at Expedia—despite its limitations, it's the most efficient site for spotting bargains. And when I get an agent involved, I let them do the final booking, even if I'm charged a small fee. Phyllis and Gina have to earn a living, too.

THE VIEW FROM 37,000 FEET

AS SOON AS my transcontinental experiments were complete, I did something I've never done before: I took out my credit card, went online, pointed my browser to Expedia, and, to paraphrase *Hawaii Five-O*'s Steve McGarrett, I booked 'em, Danno. Granted, it was only a short Los Angeles–to–San Francisco excursion, and the fare was just $106, but hey, it was a start.

But where do I go now? I'm already starting to plan two other trips for later this year—a week visiting North Carolina relatives and two weeks recovering in Italy. Most likely, I'll assume the controls for the North Carolina trip and buy my ticket at Expedia or the US Airways site (the only airline with decent N.C. flights). I've made that voyage many times and am familiar with what the carriers offer, so I won't need to shop around much.

As for that trip to Italy—a week in Tuscany, a few days in Rome, maybe a side trip to Sicily—I'm taking the passive route: Research fares online, then call my new travel agent. It's a complex itinerary, and I'll need help. For instance, should I fly to Sicily first, and then to Rome, or vice versa? A clever agent can save me time and trouble. And after she creates an itinerary, I'll go online to make sure no better fares or flights exist. After all, I've now got a good travel agent and great resources on the Web. Why shouldn't I use both?

For more travel tips, visit PC World Online at www.pcworld.com/jun99/travel. James A. Martin is a freelance writer who frequently covers travel. Michael S. Lasky is a senior associate editor for PC World. ■

Whose Fare's the Fairest of Them All?

SITE	Short-notice fare [1]	Plan-ahead fare [2]
Atevo	$1909	$304
Biztravel.com	$932	$304
Flifo	$1909	$281
Internet Travel Network	$1909	$304
MSN Expedia*	$457	$304
Preview Travel	$1591	$318
Reservation Desk at CNN.com	$1909	$304
TheTrip.com	$1086	$304
Travelocity.com	$1086	$304
AGENT		
American Express	$457	$218
Small local agency	$580	$270

* Recommended

All fares are for a round trip between San Francisco International Airport and New York's John F. Kennedy International Airport.

[1] Includes Monday morning departure and Friday afternoon return, booked only three working days in advance.

[2] Might require taking a red-eye flight or accepting other trade-offs.

SEAT-POCKET POINTERS

What to Know

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—Michael S. Lasky

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Digital Creativity Imaging Center[3]	Digital Creativity Imaging Center[3]
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Microsoft Windows98	Microsoft Windows98	Microsoft Windows98	Compaq V720 17" Monitor (15.9" VIA)
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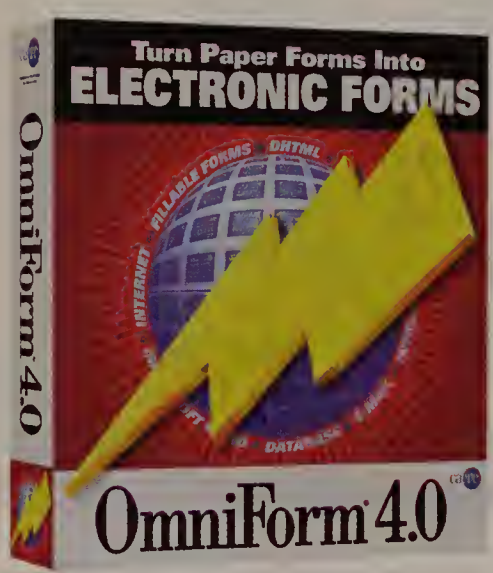
THE WEB MADE ME DO IT!

What does this "new medium" mean for document management technology? Here's a look at some recent and up-and-coming technical advances in three document management categories: document capture, collaborative knowledge management, and enterprise-wide rich media.

DOCUMENT CAPTURE

Document capture involves the conversion of paper-based documents into an electronic form so the data can be used in other applications, such as workflow, archival, or Web-based functions. One area where the Internet has significantly changed this process is in distributed document capture, Silver says. Silver is also co-founder, president, and CEO of Irvine, Calif.-based Kofax Image Products.



Caere's OmniForm 4.0 takes the forms off your desk and puts them into your computer.

Document capture has typically been used primarily in high-end business applications, like financial, insurance, or pharmaceutical companies. "These businesses tend to generate mountains of documents," says Silver. "While 90% of these documents are electronically based, such as Word documents, the remainder are paper documents that come from outside the system and are usually paper documents sitting in a folder somewhere." In order to incorporate these documents into a document management system, the document needs to be captured by a scanner that uses optical character recognition to convert the text or images into a form that can be used by the document management system.

Until recently, a distributed enterprise such as an insurance company had to use mail, couriers, or trucks to move documents from remote offices to a centralized site for capture and processing. Now however, new technology and the Internet allow the branch office to scan the documents at the remote site and download them to the central site. "This is much faster and less expensive," Silver says. "In addition, the paper documents can remain at the place of origin." Another advantage is that "the documents are being scanned by the people who generate them, as opposed to a scanning specialist," which means the person doing the scanning has a better understanding of what is important in the document.

Web-based technology is also changing some of the business applications for document capture, Silver says. "We're now seeing departmental business applications for the first time." He describes a scenario where a customer service representative receives a call from a client asking about a purchase order. "In the past, the representative would have to dig in a file folder for the purchase order and then fax it to the client." Now, thanks to recent technology, "the purchase orders can be scanned into an extranet. When a client wants to check a purchase order, he simply goes to a URL address, types in his password, and accesses the purchase order directly."

If it's "paperless" office that you are trying to achieve, Caere's OmniForm 4.0 forms software takes the forms off your desk and puts them into your computer where they belong. OmniForm 4.0's Logical Form Recognition ™ technology lets you duplicate existing forms accurately so that once they are scanned, your forms are complete with live fields ready to fill out and distribute via Microsoft Word, E-mail, or even on the web. Imagine no more invalid entries, missing data, or miscalulated totals that can make you pull your hair out and bog down your day.

COLLABORATIVE KNOWLEDGE MANAGEMENT

The Web's ability to reach a larger audience is also impacting the collaborative knowledge management area of document management. "Document management didn't really take off or become a standard before because the requirement to install client software was holding people back," says Praj Patel, director of product marketing for Waterloo, Ont.-based Open Text Corp. "This requirement is fine if you have only

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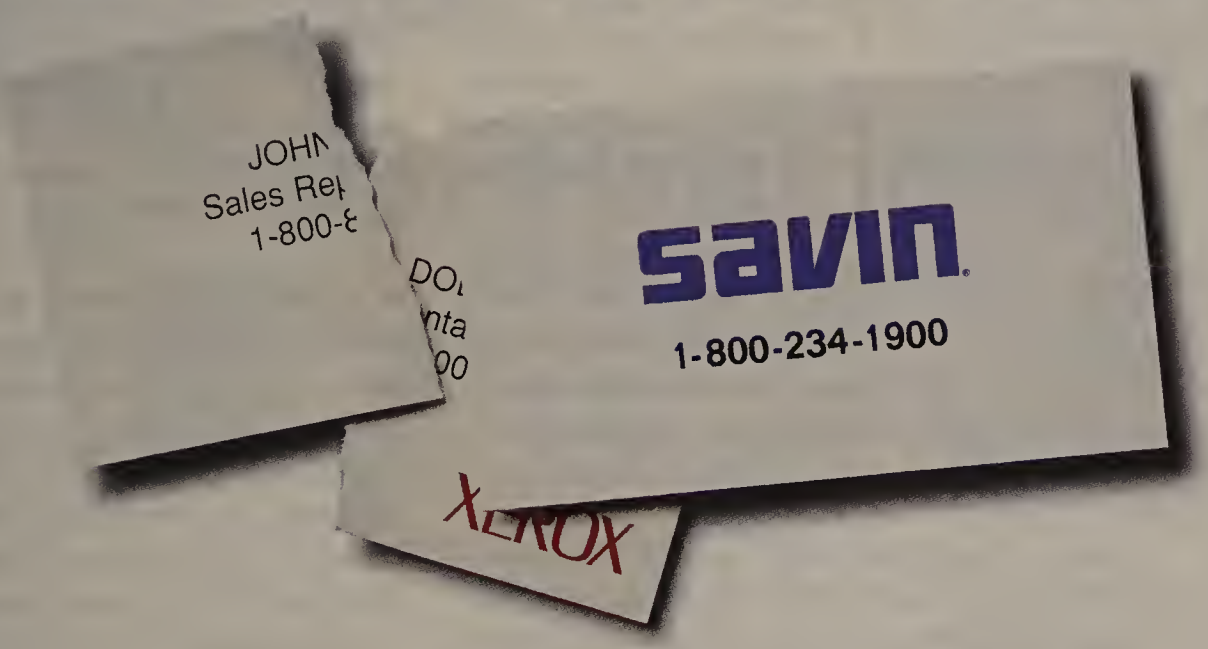

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THE WEB MADE ME DO IT!

10 people using the system. But what if there are 100, 1,000 or 100,000 users of the document management system? With a client/server system, it is too expensive and time intensive to deploy it to large groups."

Patel says using a Web browser for rapid deployment "takes away all that pain. All the server administrator needs to do is install the server software, obtain the users' names and passwords, and hand out the URL address to the users."

That's not to say that the Web doesn't pose any challenges. "It's not enough to say 'here's a big electronic bucket to throw your information into,'" Patel says. "A static electronic library is not going to make your organization more productive. You need to work with people, give them collaborative tools."

He points to threaded discussion areas and built-in task lists as examples of these collaborative tools. "Discussion areas are better than E-mail because they keep things in context. You can build up an information base that is searchable and reusable. The task lists let people know who is responsible for action items and what the due dates are."

In the future, Patel expects to see document management systems deliver information in a more personalized way. "As an individual user of the system, I need to access certain information to get things done," he says. "But over time, my electronic library is going to get pretty large. I don't have time to constantly browse or search the library. I need tools that can help me deal with this information glut, such as change agents." These change agents, he explains, will have built-in intelligence and mining information based on criteria established by the users. "For instance, the sales staff can ask the system to automatically notify them whenever a new price list is issued," he says.

"The Internet has opened up the flood gates. There's too much information now," Patel adds. "That's why personalization is a very important trend."

ENTERPRISE-WIDE RICH MEDIA

The Internet is also affecting the category of enterprise-wide rich media, according to Stephen Bertges, vice president of marketing for Milpitas, Calif.-based MediaWay Inc. According to Bertges, this industry has recently faced three challenges:

- **The ability to do document management with rich media.** "It takes lots of smarts in the software to move these big files around," he explains.
- **The lack of a standard for creative tools.** Since many of these rich files are graphics or videos, "it's not a matter of moving Word documents around," he says. "We needed to address the fact that in the creative industry there are hundreds of different kinds of desktop applications."
- **Remote access via the web.** "You need technology that allows you to check in and check out, and a customized Web gateway, which is actually a portal to the company," Bertges explains. "This hasn't been possible until very recently, when technology was introduced that not only allows rich media files to be transmitted quickly and easily, but also offers version control over the Web."

As a result of this technical advance, Bertges thinks the number of people using rich media applications will increase. "Currently, this technology is primarily used by marketing and sales people," he explains. "But I see it being adopted by other areas, such as technical support or training. Think of having a training video on the Web that employees could easily access."

Access seems to be one of the major benefits of Web-based document management technology, and makes document management products more valuable to companies, according to Silver. Sounds like whether it is rich media, knowledge management, or document capture, the Web "revolution" in document management has just begun.

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Paperless? Not Just Yet

Success in today's office, no matter how big or small, is closely tied to the intelligent and efficient flow of documents. And still, today most of those documents appear in high quality paper form.

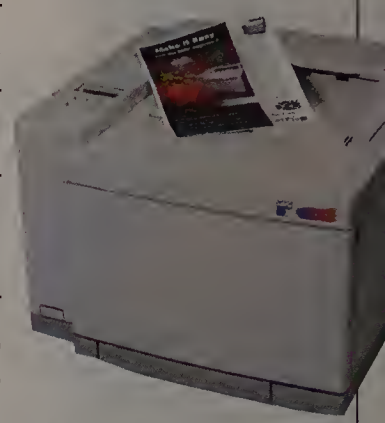
Savin's SLP416c Color Laser printer

If your needs are color sales and marketing presentations, Savin Corp.'s SLP416c Color Laser printer will make all your presentations stand out from the crowd. With sharp 600 dpi resolution and eye popping color, your audience will not only sit up and take notice, they'll shout for more! The unit is fast with black and white print speeds at 16ppm and 4ppm for full color so you won't have to wait too long to see the dazzling images you put on paper. Printing large size media is no problem because the unit can print up to an 8-in. by 14-in. page at full color output which should just about cover all your small office or workgroup needs.

Also consider Minolta's Color PageWorks L printer featuring high quality powerful printing at an affordable cost. The unit uses Minolta's patented Super Fine MT printing system to produce photo realistic color and black and white 2400 dpi photo quality images that will take your breath away and make your company newsletter the most popular reading around the office. Print speeds are a fast 12ppm monochrome and 3ppm color, so you won't have time to run down the hall for another cup of coffee. Include an Ethernet or Token Ring card and you'll be up and printing on the network in record time.

Minolta's Color PageWorks

QMS's Magicolor 2 CX laser print system is a good choice for workgroups that want remote printer configuration at great value. The CX has 24 MB RAM, more than enough for most workgroup needs, 600dpi output upgradeable to 2400dpi, and prints a fast 16ppm monochrome, 8ppm color. Busy network administrators will appreciate QMS's management capabilities, which allow administrators to install, configure, track resources, and even see if there's paper in the unit from any web browser. Need to scan? The CrownCopy option turns your printer into a color copier, doubling your investment so you can cut down on office clutter and double your resources.



QMS's Magicolor 2 CX

Toshiba's TF671 facsimile

If you need a fax machine as well, Toshiba's TF671 facsimile machine for small to mid-sized workgroups combines versatility, efficiency and cost, into one functional unit. It prints, scans, faxes, and, with the addition of optional ImageVision 7.0 software, lets administrators change machine functions directly from their PCs. The printer is speedy at 8ppm, while the unit's facsimile incorporates new "Quickscan" compression technology allowing faxes to scan into the machine at a rate of 2 seconds per page. This means you don't have to wait around for your 20-page fax to scan one slow page at a time.

Xerox Corp.'s DocuPrint NC60 Color Laser Printer

But what happens when you get finicky network dial-up connections that always seem to kick you off right before the big deadline? No need to worry. Xerox Corp.'s DocuPrint NC60 Color Laser Printer is so smart, it thinks it's a fax. A new built in E-mail feature handles remote printing so when you're out of the office you can E-mail important documents directly to the printer. You also get superior color

CONTINUED ON PAGE 8

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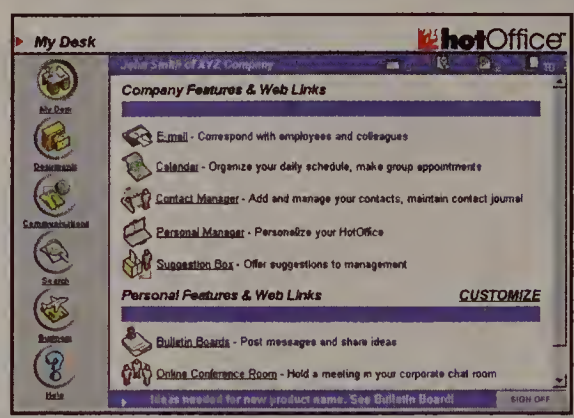
Paperless? Not Just Yet continued from page 6

output and with new Internet-enabled features like IntelliRes and ImageFix that will make your documents stand out in the crowd.



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Last, but not least, if you want your vibrant color documents to look visibly better onscreen, you'll need a video card that takes image quality as seriously as it does speed. Matrox Graphics Inc. in Dorval, Quebec Canada, does just that with the Millennium G200 video card, hailed as the the new standard in cutting-edge visual quality for 2D, 3D and video applications.

Featuring superior 2D for fast Windows rendering, and robust 3D acceleration, you'll experience the ultimate in vibrant color, sharp image quality, and performance, all at a reasonable price. The G200 is lightning-quick to handle all your visual needs, and it can handle resolutions up to 1920 x 1200. It also supports both DirectX and OpenGL.

Matrox Graphics Inc. Millennium G200 video card

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Ho Hum...

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Ricoh AP204 color laser printer

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Acer Monitors

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A monthly update of the best desktop PCs, notebooks, printers, monitors, graphics boards, and modems

PC WORLD

TOP 100

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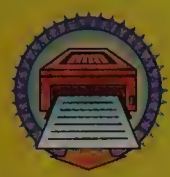
265 Printers



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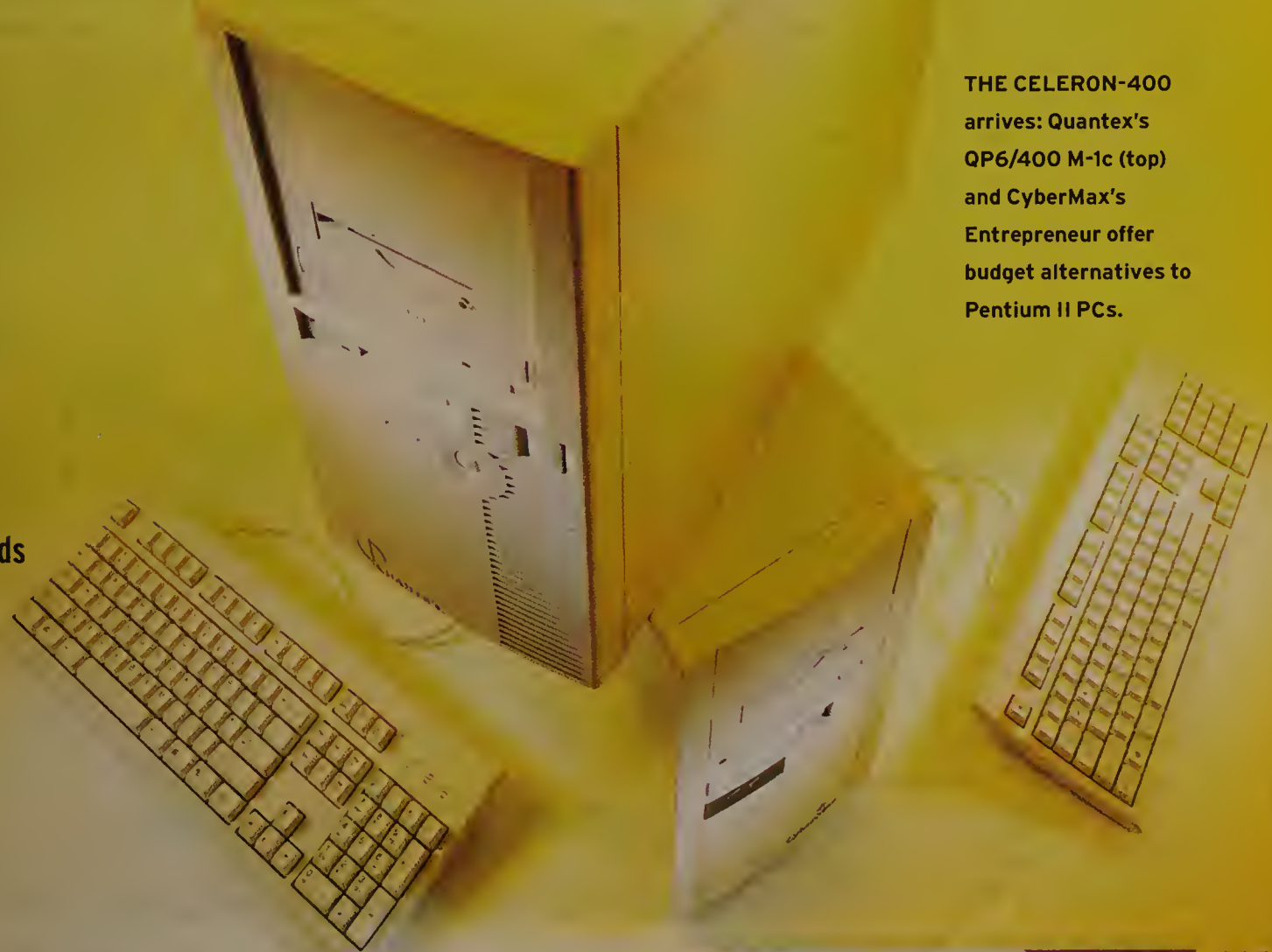
Celeron ACCELERATES

Edited by Cameron Heffernan and Mick Lockey



THE CELERON-400 arrives: Quantex's QP6/400 M-1c (top) and CyberMax's Entrepreneur offer budget alternatives to Pentium II PCs.

PHOTOGRAPHS: MARC SIMON; ICONS: JEFFREY PELO

WITH ALL THE INK Pentium-III systems have commanded in recent months, you might easily overlook the newest generation of Celeron chips Intel has been turning out. This month in Top 20 Budget Desktops, we take our first look at systems based on the Celeron-400 and also check out a Celeron-433–based PC. How did they do? Well, let's just say it looks like a Celeron's market.

Of the nine new Celeron-400 and -433 systems we tested this month, five scamper onto the chart, including two that earn Best Buys. Leading the way, Quantex's quick, feature-rich QP6/400 M-1c comes equipped with a 19-inch monitor and 4.8X DVD-ROM drive but costs only $1499—about average for a Top 20 budget desktop. Close on the heels of the Quantex is the $1199 CyberMax Entrepreneur C-400, which rates as the cheapest Celeron-400 of the bunch.

MidWest Micro's $1299 Office MWO-433C, powered by a Celeron-433 microprocessor, debuts at number 13. With a PC WorldBench 98 score of 190, it's the slowest Celeron-433 system the PC World Test Center has reviewed, but it offers a decent set of features and all-hours phone support. The $1526 Micron Millennia C433, a Celeron-433 system reviewed in *Top 10 Home PCs*, fares much better. It places third and boasts much better performance. The $1699 Umax PC PIII-454EZV—the first Pentium III-450 PC cheap enough to qualify for the budget category—missed the Top 20 desktops chart as a result of limited support and a poor price/performance ratio. Its speed equals only that of an average PII-450 PC with 128MB of RAM.

BEYOND CELERON

GIVEN THE MANY varieties of Celeron-based PCs out there, what's a budget buyer to do? Take a look at "The Price of Speed" on page 237 to gauge how well the average system equipped with various budget CPUs performs and what you can expect to pay for it.

Naturally, there's more to the charts than just the new Celeron-based PCs. Two Pentium II–equipped PCs earn Best Buys on the budget Top 20 this month, but new systems that use PII chips are becoming scarce. Many vendors we talked to either have eliminated Pentium II models altogether or plan to drop them soon.

Even so, a handful of Pentium II–based systems still rate as solid bargains. Witness NEC's $2069 PowerMate 8100: At a price $589 lower than in May, this corporate offering moves onto the power chart in ninth place. And price isn't the PowerMate's only alluring feature—it tallied a vigorous PC WorldBench 98 score of 218; and it comes with a network card, DMI management, and plenty of room for future expansion—three open drive bays and five free slots.

An even dozen systems on our power chart come equipped with Pentium III-500 chips—not to mention high-end components—and their average cost is $2629.

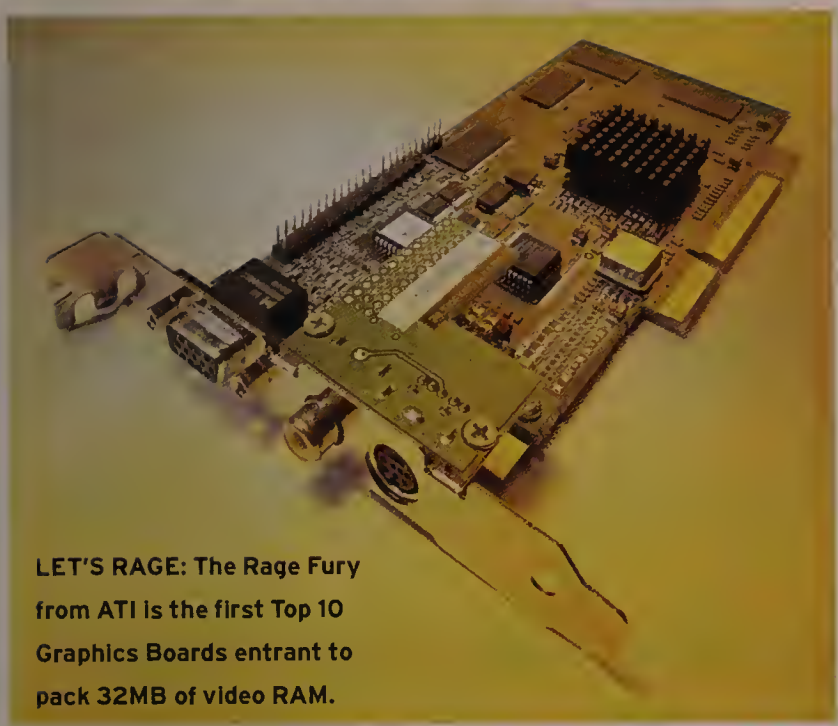
We also reviewed three new PCs that use AMD K6-2-400 CPUs, but only the $1299 IDot.com AMD K6-2-400 reaches the chart. Its PC WorldBench 98 score fell short of the Celeron-400 PCs above it.

MUSCLE MACHINES

FOR THIS MONTH'S power chart we reviewed seven new systems, only three of which did well enough to earn places in the Top 20. The most impressive rookie, Dell's $2649 OptiPlex GX1p 500, takes over the top slot. Continuing the OptiPlex line's tradition of strong, managed PCs for big businesses, this PIII-500 NT 4.0 workstation features DMI management, an integrated network card, and an interior made for easy upgrading.

Systems equipped with Pentium III-500 chips now thoroughly dominate the power chart—a trend that should become even more evident as the next few months go by. Currently, an even dozen of the Top 20 sys-

MANAGED CARE: Dell's OptiPlex GX1p 500 features an easy-off case and a chassis that slides out for simple access to expansion slots.



LET'S RAGE: The Rage Fury from ATI is the first Top 10 Graphics Boards entrant to pack 32MB of video RAM.

tems use Intel's fastest chip, which continues to sell for a premium price. The average cost of a chart-making PIII-500 system this month is $2629; this number represents a drop of a scant $73 from last month's average.

Not surprisingly, such expensive PCs typically come stocked with all the high-end components a buyer could hope for: 19-inch monitors, high-end graphics and sound cards, good speakers, and massive hard disks. If you're eager to obtain peak performance but don't need top-notch components, remember that custom configurations can shave hundreds of dollars off a system's price. Vendors' reliability and service records are another factor that differentiates these powerhouses; make sure to consider our ratings in these areas when you shop.

APPEARANCES COUNT

THIS MONTH'S Top 10 Monitors chart shows some notable shifts, courtesy of modest price drops on existing units and the appearance of two impressive new models—Sony's CPD-220GS (which features great graphics performance) and LG's 790SC (which costs just $360). For its part, ViewSonic's PT775 rides a $30 price cut into first place, loosing the IBM P92's iron grip on the top position. Prices for 17-inch monitors have begun to stabilize; the average street price now hovers at $415.

Meanwhile, on the graphics board front, ATI's new Rage Fury graphics card delivers abundant speed and colorful images, but it suffered from flawed 3D visual quality in the PC World Test Center's evaluations: Some of the objects in our 3D gaming suite appeared grainy and banded. The board's software driver needs a bit of tweaking as well: The Rage Fury couldn't run our PowerPoint presentation or Caligari 3D modeling tests (ATI says a fix for the problem is imminent). Look for our retest of the board next month.

Cameron Heffernan is an associate editor and Mick Lockey is a staff editor for PC World. *Senior Associate Editors Vince Bielski, Bryan Hastings, and Karen Silver; Associate Editor Aoife McEvoy; Staff Editor Grace Aquino; and Editorial Assistant Kalai Murugesan also contributed to the* Top 100. *Testing was performed by Ulrike Diehlmann, Robert James, Elliott Kirschling, Jeff Kuta, Nancy Miller, and Mike Salayko of the PC World Test Center. See page 14 for contact information.* ▶

The Price of Speed

CHIPS IN budget systems deliver a wide range of performance—but at steep differences in price.

CPU MODEL	Average PC WorldBench 98 score[1]	Average price
Celeron-333	171	$1279
Celeron-366	184	$1278
Celeron-400	188	$1552
Celeron-433	192	$1429
Pentium II-400	200	$1926
Pentium II-450	208	$2140

[1]As tested by the PC World Test Center running Windows 95 or 98.

YOUR GUIDE TO THE TOP 100

QUESTIONS ABOUT OUR CHARTS? The following section should answer most of them.

How do the charts work? The Top 20 and Top 10 charts are evolving lists of the best PCs, printers, monitors, graphics boards, and modems we've tested. System charts are divided by price. Power desktops cost $1800 or more; power notebooks cost $2300 or more. We compare new products to previously reviewed units, updating the charts to reflect price cuts and other changes.

Where do you get your prices? We estimate street prices based on vendor information and our own research, including surveys of retail outlets. We recheck all prices every month. Look for updated pricing information on all desktop PCs online.

What does the overall rating mean? This 100-point scale reflects results from our hands-on evaluations and performance tests. A score in the 90s is exceptional, while one in the 80s is among the best and one in the 70s above average.

What does the PC WorldBench 98 score mean? It's a measure of how fast a PC is in relation to our baseline machine, a Gateway PMMX-200 configured with 32MB of RAM, a 2GB hard drive, and 512KB of secondary cache. A PC that scores 200, for instance, is twice as fast as the baseline system.

Where do the scores for reliability, support quality, and support policies come from? Reliability and support quality scores are based on surveys of *PC World* readers and anonymous support calls made by *PC World* staff. The policies score is based on vendor support policies.

What do all those word scores mean? Word scores for performance and price are based on a product's rating in relation to other products in its category. For instance, we score the performance of Windows NT PCs separately from that of Windows 95 machines. (Based on our PC WorldBench 98 tests, Windows NT machines are faster on average than Win 95 PCs.)

Check out *PC World's* Top 400 reviews online. Point your browser to PC World Online (www.pcworld.com/top400) to explore our Top 400, which provides comprehensive reviews and ratings for products in 16 different categories. You'll also find reviews not available in print.

PC WORLD

TOP 20 POWER DESKTOPS

	SYSTEM	Last month	Month tested	Street price (3/19/99)	CPU	Comments
1	Dell OptiPlex GX1p 500 800/388-8542 www.dell.com	n/a	NEW	$2649	Pentium III-500	New Best Buy workstation has speed, features, manageability, and good design.
2	Gateway E-4200 500 800/315-2536 www.gateway.com	3	Apr 99	$2789	Pentium III-500	$110 off corporate PC featuring speed and manageability.
3	Dell Dimension XPS T500 800/388-8542 www.dell.com	2	Apr 99	$2826	Pentium III-500	Fast SOHO PC has 4.8X DVD-ROM drive, and Dell work PCs' reliability is top-rated.
4	Micron Millennia Max 500 888/634-8799 www.micronpc.com	4	Apr 99	$2899	Pentium III-500	Pricey, but has great speed; features include 22GB hard drive and 6X DVD-ROM.
5	Quantex QP6/500 SM-4x SE 800/896-4898 www.quantex.com	6	May 99	$2399	Pentium III-500	$150 off quick, feature-rich multimedia PC with Zip drive and useful biz software.
6	CyberMax Enthusiast 500 800/345-8926 www.cybermaxpc.com	5	May 99	$2199	Pentium III-500	Fast, affordable PC sheds $200, but CyberMax needs to beef up its support quality.
7	Dell Dimension XPS T450 800/388-8542 www.dell.com	n/a	NEW	$2029	Pentium III-450	New PC from Dell's SOHO line is cheap for a PIII-450.
8	Sys Performance AX-500P3 800/613-9963 www.sys.com	9	May 99	$2299	Pentium III-500	Fastest NT 4.0 system we've reviewed gets $180 cut, but documentation is poor.
9	NEC PowerMate 8100 888/863-2669 www.neccomputers.com	n/a	Jan 99	$2069	Pentium II-450	Big $589 cut brings corporate PC with network card and USB monitor onto chart.
10	Premio Apollo BX 500 800/677-6477 www.premiopc.com	14	May 99	$2800	Pentium III-500	$100 off pricey PC with skimpy multimedia; but great speed and good support.
11	CompUSA American Pro 500 888/226-6772 www.compusa.com	12	Apr 99	$2649	Pentium III-500	Good sound, a Zip drive, and a 19-inch monitor adorn this small, quick business PC.
12	Acma ZPower 7450 PII-450 800/786-6888 www.acma.com	16	Mar 99	$2468	Pentium II-450	Quick PC with LAN card, DVD-ROM, and Zip drive held back by limited expandability.
13	NexTrend NexStar 450 TNT 877/833-8833 www.nextrendpc.com	n/a	Feb 99	$2069	Pentium II-450	$270 off PC with good service policies but mediocre tech support.
14	IBM PC 300 PL 800/426-2968 www.ibm.com	n/a	Jan 99	$2269	Pentium II-450	Quick, network-ready desktop; retail only; to order, use model #6862fxj.
15	Polywell Poly 8450 B5 800/999-1278 www.polywell.com	19	Jan 99	$1999	Pentium II-450	Still the fastest Pentium II-450 system we've tested on Windows 98.
16	Compaq Prosignia Desktop 330 800/345-1518 www.compaq.com	n/a	May 99	$2799	Pentium III-500	$191 off quick small-business PC with Zip drive and 5X DVD-ROM drive.
17	Compaq Deskpro EN 6500X 800/345-1518 www.compaq.com	17	May 99	$2869	Pentium III-500	Fast but pricey corporate managed system; support could be better.
18	HP Brio BAx PIII-500 800/752-0900 www.hp.com/desktops	n/a	NEW	$2366	Pentium III-500	Manageable small-biz PC comes with 4.8X DVD-ROM drive, limited support hours.
19	Axis Systems Orion 100V DVD 450 800/378-9014 www.axissys.com	n/a	Apr 99	$2128	Pentium II-450	Affordable multimedia PC has 4.8X DVD-ROM drive, Zip drive, and 19-inch monitor.
20	Micron Millennia 400 Max 888/634-8799 www.micronpc.com	n/a	July 98	$1975	Pentium II-400	6X DVD-ROM drive; Diamond Viper V550 graphics card has 16MB of RAM.

Best Buy See features chart, page 240; test report, page 242. Find updated street prices online (www.pcworld.com/powerdesktops/late_prices).

n/a = not applicable

[1] A system's performance word score is relative to scores of other PCs running the same operating system. For more details see "Your Guide to the Top 100" on page 237.

[2] For more information about all of the products listed in this table, select product info number 906 or visit www.pcworld.com/productinfo.

IT'S A PARTY OF III THIS MONTH—Pentium III, that is. Led by the Dell OptiPlex GX1p 500, PIII-500 systems sweep the five Best Buy slots for the first time. Seven other PIII-500 PCs win Top 20 spots, as do a PIII-450 system (another newcomer from Dell), six Pentium II-450s, and one grizzled PII-400. The new OptiPlex corporate workstation has management features, an easy-open case, and Dell's strong service and reliability record. Another debutant, HP's Brio BAx PIII-500, crashes the chart at number 18, despite a cramped interior and so-so support policies. The new Toshiba Equium 7100M PII-450 fell just short; this manageable midsize tower features PC Card slots and a Zip drive, but is rather poky.

SCORECARD

★ Overall rating	PC WorldBench 98/operating system	Performance [1]	Features and design	Vendor's system reliability	Price	Vendor's support quality/policies	Product info number [2]
94	284/Win NT 4.0	outstanding	very good	outstanding	average	good/outstanding	–
92	235/Win 98	outstanding	outstanding	good	expensive	good/outstanding	671
92	234/Win 98	outstanding	very good	outstanding	expensive	good/good	–
89	237/Win 98	outstanding	outstanding	good	expensive	fair/good	672
88	235/Win 98	outstanding	outstanding	good	average	good [3]/good	673
88	236/Win 98	outstanding	very good	fair	inexpensive	good [3]/good	674
84	218/Win 98	good	good	outstanding	inexpensive	good/good	–
83	287/Win NT 4.0	outstanding	very good	[4]	average	fair [3]/good	675
79	218/Win 95	good	good	good	inexpensive	good [3]/good	676
78	233/Win 98	outstanding	very good	[4]	expensive	good [3]/fair	677
77	230/Win 98	outstanding	very good	[4]	average	fair [3]/good	678
75	218/Win 98	good	very good	[4]	average	good [3]/good	679
75	217/Win 98	good	very good	[4]	inexpensive	fair [3]/good	680
74	219/Win 98	good	satisfactory	good	average	good/fair	–
74	224/Win 98	very good	good	[4]	very inexpensive	fair [3]/fair	681
73	228/Win 98	very good	good	fair	expensive	fair/good	682
73	232/Win 98	outstanding	satisfactory	fair	expensive	fair/good	683
72	229/Win 98	very good	satisfactory	fair	average	good/fair	684
72	213/Win 98	satisfactory	good	[4]	inexpensive	good [3]/outstanding	685
71	210/Win 95	satisfactory	satisfactory	good	very inexpensive	fair/good	686
Scorecard weightings ▶		Performance 25 percent	Features 25 percent	Reliability 15 percent	Price 15 percent	Quality/policies 10 percent each	

[1] Due to insufficient data from the Reliability and Service survey for the vendor's work PCs, this rating is derived from anonymous support-quality calls, from survey scores for the vendor's home PCs, or from both.

[4] Insufficient data to give a rating.

This Month's Best Buys

1 DELL OPTIPLEX GX1P 500

PRO: Great performance, easy-access case, top-notch company reliability and support policies

CON: Somewhat puny monitor for a Best Buy PC

If you're looking for a high-performance corporate workstation and have a healthy budget, put Dell's $2649 OptiPlex GX1p 500 on your shopping list. No other system here matches its combination of speed and features, and no vendor matches Dell for reliability and support quality, according to our readers.

Any IS department would love the conveniences this sturdy midsize tower offers when upgrade time arrives: The case's side panels lift off quickly, and you can easily pull out the card-slot tray, for fast board-swapping. The GX1p 500 is a great choice for any firm deploying a large contingent of PCs that regularly need upgrading.

Our test machine came with Microsoft's Natural Keyboard, on which the keys are optimally arranged for ergonomically proper positioning of your hands and arms while typing. Though we found the keyboard comfortable to use and reasonably easy to adjust to, the reengineered layout won't please everybody; you should definitely test-drive a Natural Keyboard before buying one.

The PC ships with a fairly capacious 14.4GB hard drive and a 100MB Zip drive. The system's six open slots present you with plenty of room for additional adapters, but Dell provides a scant two open drive bays. In keeping with the OptiPlex line's corporate focus, a network interface card comes standard on the GX1p; or for $89 you can opt for an Aztech Rockwell V.90 modem.

Dell OptiPlex GX1p 500

The unit's only significant flaw is the 17-inch Dell 1028L monitor—it produced somewhat dark images and slightly fuzzy text. Upgrading to the superior 19-inch Dell UltraScan 1200HS costs you $200.

Setting up the OptiPlex is straightforward. All the ports are color-coded, making it easy to hook up devices, and Dell supplies surprisingly detailed documentation, considering that this is a corporate PC. In addition to separate user guides for all the peripherals, Dell provides an in-depth system installation manual, a big foldout chart, and a general user guide for assistance once you're up and running. If you still need help, Dell maintains around-the-clock technical support. Respondents to our most recent survey give Dell outstanding marks for reliability; Dell's service, while not perfect, still ranks among the best in the industry.

2 GATEWAY E-4200 500

PRO: Great speed, good management features

CON: Expensive

Even after undergoing a $110 price cut, Gateway's $2789 E-4200 Pentium III-500 remains one of ▶

PHOTOGRAPHS: KEN SMITH

TOP 20 POWER DESKTOPS — STANDARD FEATURES

	SYSTEM [1]	CPU	Operating system	RAM (MB)	Level 2 cache (KB)	Hard drive (GB)	Graphics adapter (AGP unless noted)	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	56-kbps modem protocol
1	Dell OptiPlex GX1p 500*	Pentium III-500	Windows NT 4.0	128	512	14.4	STB NVidia TNT (PCI)	16/SDRAM	17/15.9	not included
2	Gateway E-4200 500*	Pentium III-500	Windows 98	128	512	22	ATI Rage 128	16/SDRAM	19/18	not included
3	Dell Dimension XPS T500*	Pentium III-500	Windows 98	128	512	22	ST8 NVidia TNT 3D	16/SDRAM	17/15.9	V.90
4	Micron Millennia Max 500*	Pentium III-500	Windows 98	128	512	22	Diamond Viper V550	16/SDRAM	19/17.9	V.90
5	Quantex QP6/500 SM-4x SE*	Pentium III-500	Windows 98	128	512	13	ST8 Velocity 4400	16/SDRAM	19/17.9	V.90
6	CyberMax Enthusiast 500	Pentium III-500	Windows 98	128	512	13.6	STB Velocity 4400	16/SDRAM	19/17.9	V.90
7	Dell Dimension XPS T450	Pentium III-450	Windows 98	64	512	12.9	STB NVidia TNT	16/SDRAM	17/16	V.90
8	Sys Performance AX-500P3	Pentium III-500	Windows NT 4.0	128	512	10.1	Matrox Millennium G200	8/SGRAM	19/17.9	not included
9	NEC PowerMate 8100	Pentium II-450	Windows 95	64	512	14.4	Accel Graphics AccelStar 3D II	8/SDRAM	17/15	not included
10	Premio Apollo BX 500	Pentium III-500	Windows 98	128	512	14.4	Diamond Viper V550	16/SDRAM	19/18	V.9D
11	CompUSA American Pro 500	Pentium III-500	Windows 98	128	512	14.4	ST8 Velocity 4400	16/SDRAM	19/17.6	V.90
12	Acma ZPower 7450 PII-450	Pentium II-450	Windows 98	128	512	14.4	Number Nine Revolution IV	16/SDRAM	17/16.1	V.90
13	NexTrend NexStar 450 TNT	Pentium II-450	Windows 98	128	512	14	ST8 Velocity 4400	16/SDRAM	17/16	V.90
14	IBM PC 300 PL	Pentium II-450	Windows 98	64	512	9.1	Matrox Millennium G200	8/SGRAM	17/16	not included
15	Polywell Poly 8450 B5	Pentium II-450	Windows 98	128	512	10	Matrox Millennium G200	8/SGRAM	17/16	V.90
16	Compaq Prosignia Desktop 330	Pentium III-500	Windows 98	128	512	22.6	ST8 Velocity 4400	16/SDRAM	19/18	V.90
17	Compaq Deskpro EN 6500X	Pentium III-500	Windows 98	128	512	14.4	ST8 Velocity 4400	16/SDRAM	17/15.9	not included
18	HP Brio BAx PIII-500	Pentium III-500	Windows 98	128	512	13	integrated Matrox G200	8/SDRAM	17/15.9	not included
19	Axis Systems Orion 100V DVD 450	Pentium II-450	Windows 98	128	512	13.7	Diamond Viper V550	16/SDRAM	19/18	V.90
20	Micron Millennia 400 Max	Pentium II-400	Windows 95	64	512	13	Diamond Fire GL 1000 Pro	8/SGRAM	17/16	V.90

* Best Buy

[1] Configuration as tested. Vendor may have since changed components.

[2] *PC World* defines towers as taller than 20 inches, midtowers as 15.5 inches to 20 inches, and minitowers as shorter than 15.5 inches.

[3] Five years on CPU and main RAM, three years on other parts.

Gateway E-4200 500

the most expensive PIII-500 machines appearing on this month's power list. Nevertheless, this imposingly tall and wide midsize tower has a great deal to recommend it. In fact, the system easily qualifies as one of our top choices for consumers who are on the lookout for a power-packed, multimedia-equipped business workstation.

Besides flaunting such corporate accoutrements as an ethernet card and DMI management software, the E-4200 500 delivers top-notch performance—as measured by the PC World Test Center—and an excellent audiovisual experience. This unit's overall PC WorldBench 98 score of 235 puts it in a virtual dead heat with the other three Best Buys that ran on the Windows 98 operating system.

The system's ATI Rage 128 graphics card helps the 19-inch Gateway monitor display images vividly, and the Altec Lansing GCS100 speakers and subwoofer offer rich sound. As usual, Gateway supplies excellent documentation with the system, and the company's record for reliability and service in support of its work PCs remains strong.

PC users of a more price-conscious bent should consider the Pentium III-450 version of the E-4200. At $2550, it costs $239 less than its 500-MHz sibling. Moreover, it contains an equally large hard drive (22GB) and chalked up a creditable PC WorldBench 98 score of 220.

3 DELL DIMENSION XPS T500

PRO: 4.8X DVD-ROM drive with decoder card, outstanding company reliability, good support

CON: Expensive for a small-business PC, only 17-inch monitor

If you seek a feature-rich, multimedia-capable system for your growing business, the $2826 Dell Dimension XPS T500 may give you a good excuse to splurge. Dell amply equips this thin, off-white midsize tower for the office, and tosses in a few extra hardware features so you can have a little after-hours fun. The XPS T500, with its swift PIII-500 processor, earned a PC WorldBench 98 score of

Dell Dimension XPS T500

		EXPANDABILITY					CUSTOMER SUPPORT			
CD/DVD-ROM drive speed	Sound board	Case style [2]	Max. RAM (MB)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
17X-40X	integrated Crystal Audio	midtower	768	2	1/1	6	3/3	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
13X-32X	Creative Ensoniq AudioPCI	midtower	384	2	3/2	2	3/3	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
4.8X DVD-ROM	Turtle Beach Montego II PCI	midtower	768	2	2/1	2	3/1	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
6X DVD-ROM	Sound Blaster Live Value	midtower	384	2	2/1	3	varies [3]/1	24	Sat, Sun	BBS, CIS, WWW
4.8X DVD-ROM	Sound Blaster Audio PCI64V	midtower	384	1	2/2	4	3/1	24	Sat, Sun	BBS, WWW
4.8X DVD-ROM	Aztech PCI 33B-A3D	midtower	384	1	3/3	4	3/1	24	Sat, Sun	BBS, WWW
17X-40X	integrated Yamaha YMF724F-V	midtower	768	2	3/1	4	3/1	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
14X-40X	Sound Blaster AWE64	midtower	1024	3	3/2	4	varies [4]/5	24	Sat, Sun	WWW
12X-32X	integrated Crystal PnP	midtower	384	2	2/1	5	3/3	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
14X-32X	Sound Blaster Live	midtower	1024	3	3/2	4	3/3	10	none	BBS, WWW
5X DVD-ROM	Sound Blaster Live	midtower	768	2	2/1	3	varies [5]/1	24	Sat, Sun	WWW
4.8X DVD-ROM	Sound Blaster Live	midtower	384	2	1/0	1	3/1	24	Sat, Sun	BBS, WWW
2X DVD-ROM	Sound Blaster Audio PCI64	midtower	1024	3	2/0	4	3/3	24	Sat, Sun	none
14X-32X	integrated Crystal PnP	desktop	384	2	1/0	4	3/1	24	Sat, Sun	AOL, BBS, CIS, WWW
2X DVD-ROM	Aztech PCI 33B-A3D	midtower	1024	3	3/1	3	3/5	24	Sat, Sun	WWW
5X DVD-ROM	Sound Blaster Live Value	midtower	384	2	0/1	3	3/1	24	Sat, Sun	AOL, BBS, CIS, Prodigy, WWW
14X-40X	integrated ES1869	desktop	384	2	1/0	3	3/1	24	Sat, Sun	AOL, BBS, CIS, WWW
4.8X DVD-ROM	integrated Crystal Sound Fusion	minitower	512	1	1/0	3	3/1	12	none	AOL, CIS, WWW
4.8X DVD-ROM	Sound Blaster Live	midtower	384	2	2/0	4	3/3	24	Sat, Sun	WWW
6X DVD-ROM	integrated Crystal PnP	midtower	384	2	2/1	4	varies [3]/1	24	Sat, Sun	BBS, CIS, WWW

[4] Six years on CPU and main RAM, three years on other parts.

[5] One year on monitor, three years on other parts.

234, just a couple of ticks behind the fastest Windows 98 unit on the chart, Micron's Millennia Max 500.

Color-coded, labeled, and icon-marked ports—plus a good array of peripheral manuals and an illustrated, foldout setup guide—help you get up and running fast. And the XPS T500's sturdy, easy-open case and tidy interior make accessing the main memory a cinch when you're ready to add more. The solid Dell QuietKey keyboard felt very comfortable to type on.

The system includes a CineMaster hardware DVD decoder card with a 4.8X DVD-ROM drive for smooth video playback, and the giant 22GB hard disk and standard Iomega Zip drive provide plenty of storage space. The 17-inch Dell UltraScan 1000HS monitor generates sharp text and rich colors, but most competing models in this price range come with 19-inch monitors. Upgrading to the 19-inch Dell UltraScan 1200HS costs $200.

Meanwhile, the Altec Lansing ACS295 speaker-subwoofer system, teamed with the top-tier Turtle Beach Montego II PCI audio card, delivers full-bodied sound.

PC World readers recently gave Dell's system reliability and service grades of outstanding and good, respectively.

4 MICRON MILLENNIA MAX 500

PRO: Blazing speed, multimedia components including a 6X DVD-ROM drive, good manual

CON: Most expensive PC on the chart

If you plan on wringing every last ounce of performance out of your next PC, check out Micron's Millennia Max 500. It sells for a hefty $2899, but it's the fastest Win 98 PC on the chart and has a wagonload of features, including a Zip drive; a crisp, bright 19-inch monitor; and one of the first 6X DVD-ROM drives we've seen. However, subscribers in our most recent Reliability and Service survey rated Micron's support quality as just fair.

Micron Millennia 500 Max

We were greatly impressed by the Max 500's multimedia capabilities. Our unit shipped with the Diamond Viper V550, which ranked as the number three AGP card on our *Top 10 Graphics Boards* list in March. Meanwhile, the combination of the Monsoon MM-1000's mas- ▶

sive subwoofer (which by itself approaches the size of a compact stereo system) and a pair of satellite speakers produce rich, full-range tones.

Micron includes thorough documentation with the Max 500 and offers solid warranties covering labor for one year and parts for three years (main RAM and CPU are covered for five years).

If you want to spend less, consider the $2699 Millennia 450 Max. Except for the marginally slower processor and a smaller hard drive (14.4GB), the 450 Max is identical to its marquee sibling. The 450 Max's PC WorldBench 98 score of 219 is only 8 percent slower than the Max 500's 237, and it sells for $200 less.

5 QUANTEX QP6/500 SM-4X SE

PRO: Great performance on a nicely loaded PC

CON: Cover is a bit difficult to slide on and off

The Quantex QP6/500 SM-4x SE moves into Best Buy territory this month on the strength of a $150 reduction in price to $2399. This powerful Pentium III-500 PC brings an embarrassment of riches to the desktop, with just about everything a small workgroup or home office might need, from top-notch performance to an attractive array of multimedia features to a well-rounded software bundle.

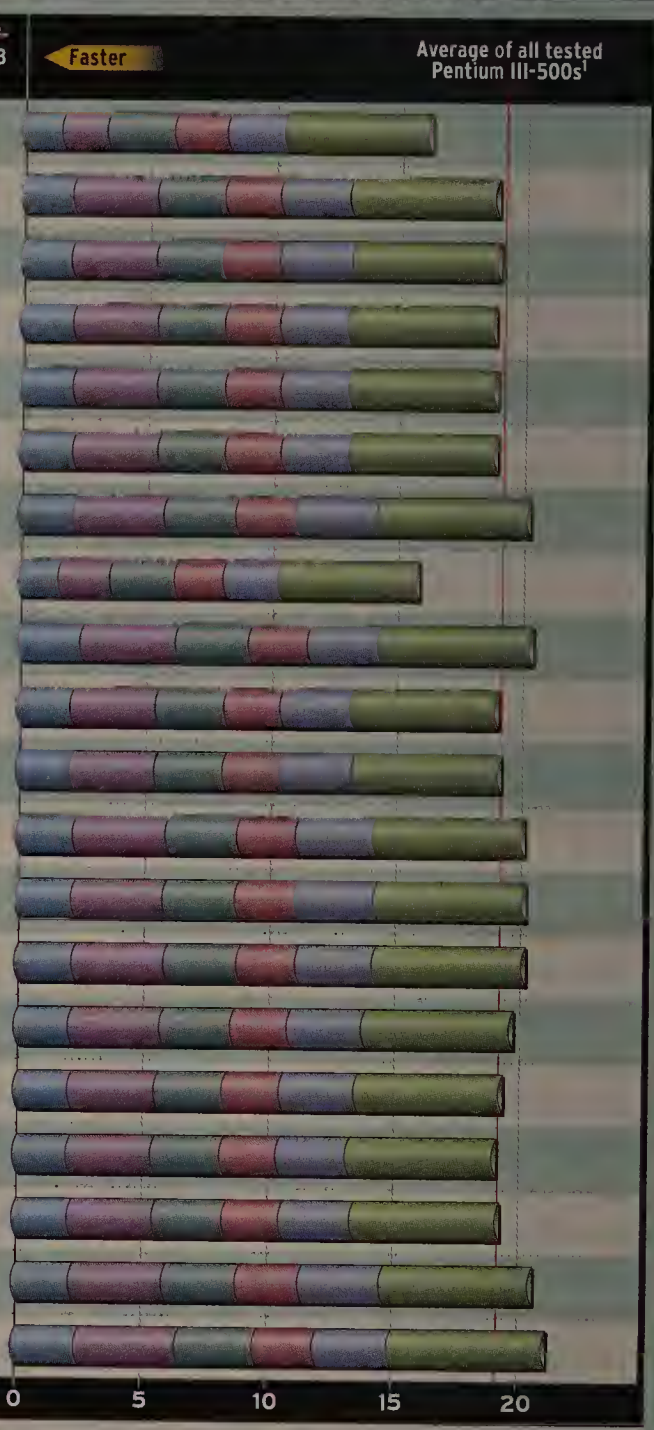
Quantex QP6/500 SM-4x SE

The SM-4x SE achieved a blistering PC

TOP 20 POWER DESKTOPS

TEST REPORT

	SYSTEM	CPU	Operating system	RAM (MB)	Level 2 cache (KB)	PC WorldBench 9B score
1	Dell OptiPlex GX1p 500*	Pentium III-500	Win NT 4.0	128	512	284
2	Gateway E-4200 500*	Pentium III-500	Win 98	128	512	235
3	Dell Dimension XPS T500*	Pentium III-500	Win 98	128	512	234
4	Micron Millennia Max 500*	Pentium III-500	Win 98	128	512	237
5	Quantex QP6/500 SM-4x SE*	Pentium III-500	Win 98	128	512	235
6	CyberMax Enthusiast 500	Pentium III-500	Win 98	128	512	236
7	Dell Dimension XPS T450	Pentium III-450	Win 98	64	512	218
8	Sys Performance AX-500P3	Pentium III-500	Win NT 4.0	128	512	287
9	NEC PowerMate 8100	Pentium II-450	Win 95	64	512	218
10	Premio Apollo BX 500	Pentium III-500	Win 98	128	512	233
11	CompUSA American Pro 500	Pentium III-500	Win 98	128	512	230
12	Acma ZPower 7450 PII-450	Pentium II-450	Win 98	128	512	218
13	NexTrend NexStar 450 TNT	Pentium II-450	Win 98	128	512	217
14	IBM PC 300 PL	Pentium II-450	Win 98	64	512	219
15	Polywell Poly 8450 B5	Pentium II-450	Win 98	128	512	224
16	Compaq Prosignia Desktop 330	Pentium III-500	Win 98	128	512	228
17	Compaq Deskpro EN 6500X	Pentium III-500	Win 98	128	512	232
18	HP Brio BAx PIII-500	Pentium III-500	Win 98	128	512	229
19	Axis Systems Orion 100V DVD 450	Pentium II-450	Win 98	128	512	213
20	Micron Millennia 400 Max	Pentium II-400	Win 95	64	512	210



*Best Buy

Word 97 | Word Pro 97 | Excel 97 | 1-2-3 97 | Paradox 8.0 | Picture Publisher 7.0

TEST PC WORLD CENTER

HOW WE TEST All systems are tested with PC WorldBench 98, *PC World*'s application-based benchmark. A higher PC WorldBench score is better. All PCs are tested with Windows 95, Windows 98, or Windows NT 4.0, and video resolution is set to 800 by 600 in 65,536 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench 98 score is a sum of the weighted, normalized result of each script: Word 97 (10 percent), Word Pro 97 (10 percent), Excel 97 (20 percent), 1-2-3 97 (20 percent), Paradox 8.0 (20 percent), and Picture Publisher 7.0 (20 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing). [1]Under Windows 98 with 128MB of RAM; also includes systems tested in this and previous months that do not currently rank among the Top 20.

WorldBench 98 score of 235, which places it in a league with the fastest Windows 98 computers on the chart. The 19-inch monitor displays crisp images and comes with easy-to-adjust controls; the Altec Lansing ADA305 speaker system fills the room with rich sound; and the 4.8X DVD-ROM drive delivers flawless video playback. Quantex crowns the package with a healthy dollop of bundled applications, including Microsoft Office Small Business Edition, Microsoft Money, and Compton's Home Library.

We do have a few design quibbles, however. The PC's connectors come labeled with stickers that may peel and fall off, leaving inexperienced users to puzzle over what goes where; the keyboard clacks noisily; and removing or replacing the case cover requires finesse. But once inside the PC, we found well-organized cabling and unobstructed access to the memory and expansion slots.

Quantex includes well-written, sensibly organized documentation, including an illustrated, foldout setup guide. The vendor backs its PCs with a three-year parts warranty and one year of labor coverage.

New This Month

The following systems made our Power Desktops chart for the first time this month. For brief reviews of previously tested machines on the chart, visit PC World Online (www.pcworld.com/top400).

7 DELL DIMENSION XPS T450

PRO: Affordable, good manuals and support, terrific company reliability

CON: Second-tier feature set, monitor picture quality just adequate

For most small businesses, especially those that lack an IS staff, PC reliability and service are key concerns. Dell's unmatched reputation for reliable PCs, well-written documentation, and solid support help make this $2029 PIII-450 midsize tower a solid Top 20 value. A complement of undistinguished features and a couple of design drawbacks keep it from reaching the Best Buy ranks, though.

Dell Dimension XPS T450

The quick T450 is an alternative to the more expensive PIII-500 systems occupying the highest rungs on the chart. The T450's features are functional but nothing to e-mail home about. For example, at this price you won't get a 19-inch monitor in the standard configuration. If you don't like the T450's bundled 17-incher, you can upgrade to the winning 19-inch UltraScan 1200HS for an extra $200.

Belying its name, the Dell QuietKey keyboard clacked a bit when we typed on it; nonetheless, it felt comfortable and durable. Images on the 17-inch Dell M780 monitor appeared a tad on the fuzzy side, but the screen works fine for basic business tasks. The bundled Harman/Kardon HK195 speakers yield decent acoustics, though we've heard fuller, richer sound from a number of Altec Lansing models. The XPS T450's software bundle includes Microsoft Office Small Business Edition and Microsoft Streets Plus.

The Dimension is nicely designed for users who need to get their machines up and running in a hurry. The PC's color-coded cables make connecting peripherals easy, and the well-written manuals include lots of helpful illustrations.

The XPS T450's tidy interior provides plenty of room to add more devices—four free expansion slots and four free drive bays. That's a good thing, since the system comes without a Zip drive at this price; you can add one for $79 from Dell. Another nice touch inside: Dell placed a ventilation hood over the CPU to shunt excess heat from the processor directly out the PC's back panel.

18 HP BRIO BAX PIII-500

PRO: Management features, strong performance

CON: Limited expandability, minitower design makes for cramped upgrades, vendor's support policies less generous than most

Working in a small office doesn't disqualify you from managing multiple PCs. In addition to an integrated network card, the Hewlett-Packard Brio BAx offers remote management, hardware diagnostics, virus protection, and other security features through TopTools, HP's DMI-compliant remote-management software. And thanks to a Pentium III-500 CPU, the $2366 Brio BAx is fast, earning a PC WorldBench 98 score of 229.

The short, gray minitower crams a lot of features into a small package, including a 4.8X DVD-ROM drive and a 13GB hard disk. Documentation is comprehensive, with a thorough setup guide, a user manual, and a useful guide dedicated to component upgrades.

HP Brio BAx PIII-500

The 17-inch monitor and integrated Matrox Millennium G200 video card combine for adequate but not outstanding picture quality. The PC lacks external speakers, but you can add Labtec speakers from HP's Web site; they range in price from $33 to $110.

You don't need tools to open the computer's sturdy case. But like most minitowers, the Brio BAx has a very tight interior, which makes upgrading almost anything a time-consuming chore. And HP's decision to position the power supply smack-dab in the middle of the system doesn't make things any easier. Installing new hard drives in 20 of these pillboxes would take many aggravating hours.

Unfortunately, HP's support policies do little to alleviate the situation. Though the PC is covered by a standard three-year parts/one-year labor warranty, technical support lines are open for just 12 hours—and only on weekdays. Furthermore, our subscribers have rated the reliability of HP's work PCs as merely fair.

HP plans to include with the system your choice of Microsoft Office 97 Small Business Edition or Microsoft Office 2000, when it becomes available. ▶

BEYOND THE TOP 20

online

We evaluated the following systems along with the others, but they didn't score high enough to reach the *Top 20 Power Desktops* chart. For write-ups, go to PC World Online (www.pcworld.com/t20pcs).

- **Compaq Deskpro EP C400**
- **NexTrend NexStar-C400P**
- **Toshiba Equium 7100M PII-450**

PC WORLD

TOP 20 BUDGET DESKTOPS

	SYSTEM	Last month	Month tested	Street price (3/19/99)	CPU	Comments
1	Quantex QP6/400 M-1c 800/896-4898 www.quantex.com	n/a	NEW	$1499	Celeron-400	Near-PII-400 speed, Zip and DVD-ROM drives, and 19-inch monitor for under $1500.
2	Gateway GP6-400 800/315-2536 www.gateway.com	2	Mar 99	$1718	Pentium II-400	Quick, small-biz PC with network card and sharp monitor; now has 13GB hard disk.
3	Gateway E-1200 366 800/315-2536 www.gateway.com	5	May 99	$1029	Celeron-366	$221 off very affordable and manageable corporate desktop workstation.
4	CyberMax Entrepreneur C-400 800/345-8926 www.cybermaxpc.com	n/a	NEW	$1199	Celeron-400	Lowest-priced Celeron-400 PC on chart has Zip drive and decent expandability.
5	Quantex QP6/400 M-4x SE 800/896-4898 www.quantex.com	n/a	Mar 99	$1749	Pentium II-400	Powerful multimedia PC, now stocked with 4.8X DVD-RDM drive, gets $150 price cut.
6	Sys TaskMaster Z366C 800/613-9963 www.sys.com	4	Apr 99	$1299	Celeron-366	Celeron-366 PC has great expandability and good support policies.
7	Xi Computer 400A MTower SP 800/432-0486 www.xicomputer.com	n/a	NEW	$1499	Celeron-400	This small-business system is the fastest Celeron-400 we've tested.
8	Micro Express MicroFlex-PII/450LC 800/989-9900 www.microexpress.net	n/a	NEW	$1599	Pentium II-450	Great performance on this NT-based midtower workstation; terrific support policies.
9	CyberMax Enthusiast KII-400R 800/345-8926 www.cybermaxpc.com	6	Apr 99	$1449	AMD K6-2-400	Average-priced business PC comes with 19-inch monitor, Zip drive, 4.8X DVD-RDM drive.
10	Axis Systems Orion 100C DVD 800/378-9014 www.axissys.com	7	Apr 99	$1698	Pentium II-450	$50 off strong-performing multimedia system; good price for a PII-450 machine.
11	IDot.com 366LXA 888/388-4368 www.idot.com	8	May 99	$1126	Celeron-366	Basic PC at a great price, but shy on features and support quality; no software bundle.
12	Micro Express MicroFlex-4A 800/989-9900 www.microexpress.net	15	Apr 99	$1299	AMD K6-2-400	Small-office PC with 4.8X DVD-RDM drive gets a $200 price cut.
13	MidWest Micro Office MWO-433C 800/728-8582 www.mwmicro.com	n/a	NEW	$1299	Celeron-433	Small-business system features a SuperDisk drive and outstanding support policies.
14	Xi Computer 333A MTower 800/432-0486 www.xicomputer.com	10	Mar 99	$1329	Celeron-333	Fast for its processor class, with decent price and good management features.
15	Axis Systems Metropolis NX5-333C 800/378-9014 www.axissys.com	19	Mar 99	$998	Celeron-333	$146 off already-low price, but speed and features are lackluster.
16	CompUSA American Pro 366 888/226-6772 www.compusa.com	11	Apr 99	$1499	Celeron-366	Offering from CompUSA's small-office line comes with Zip drive and good sound.
17	Compaq Prosignia Desktop 310 800/345-1518 www.compaq.com	17	Apr 99	$1299	Celeron-366	Small-biz PC now includes Matrox Millennium G100 graphics card with 4MB of SGRAM.
18	IDot.com AMD K6-2-400 888/388-4368 www.idot.com	n/a	NEW	$1299	AMD K6-2-400	Affordable but basic SOHO system offers decent performance but no software bundle.
19	IBM 300 GL Small Business Series 800/426-2968 www.ibm.com	n/a	May 99	$1775	Pentium II-400	Small-business desktop PC comes with network card; subpar performance for a PII-400.
20	Micron Millennia C400 888/634-8799 www.micronpc.com	n/a	NEW	$1525	Celeron-400	New small-business system has big 13GB hard disk but little room for expansion.

Best Buy See features chart, page 246; test report, page 248. Find updated street prices online (www.pcworld.com/budgetdesktops/late_prices).

n/a = not applicable

[1] A system's performance word score is relative to scores of other PCs running the same operating system. For more details see "Your Guide to the Top 100" on page 237.

[2] For more information about all of the products listed in this table, select product info number 904 or visit www.pcworld.com/productinfo.

IT WAS A BUSY MONTH in the budget segment, with seven new systems making the chart and two—Quantex's QP6/400 M-1c and CyberMax's Entrepreneur C-400—claiming Best Buys. The Quantex is among the fastest Celeron-400 machines we've tested and comes with a 19-inch monitor, a Zip drive, and a 4.8X DVD-ROM drive. The CyberMax, the lowest-price Celeron-400 PC on the chart, also packs a Zip drive. Skimpy documentation and a relatively high price narrowly prevent the speedy Xi 400A MTower SP from earning a Best Buy. Meanwhile, Pentium II–based systems are disappearing from the budget chart; the only new one to make this month's list is Micro Express's MicroFlex-PII/450LC, in eighth place.

SCORECARD

★ Overall rating	PC WorldBench 98/operating system	Features and design	Price	Performance [1]	Vendor's system reliability	Vendor's support quality/policies	Product info number [2]
85	198/Win 98	very good	average	very good	[3]	fair [4]/good	646
84	203/Win 98	good	expensive	very good	good	good/outstanding	647
84	177/Win 98	satisfactory	very inexpensive	satisfactory	good	good/outstanding	648
83	188/Win 98	good	inexpensive	good	fair	good [4]/good	649
82	203/Win 98	very good	expensive	very good	good	good [4]/good	650
82	193/Win 98	good	inexpensive	good	[3]	fair [4]/good	651
82	199/Win 98	good	average	very good	[3]	good [4]/good	652
82	256/Win NT 4.0	good	average	outstanding	[3]	fair [4]/outstanding	653
81	187/Win 98	very good	average	good	fair [3]	good [4]/good	654
80	210/Win 98	good	expensive	outstanding	[3]	good [4]/outstanding	655
80	185/Win 98	satisfactory	inexpensive	good	[3]	fair [4]/good	656
79	183/Win 98	good	inexpensive	good	[3]	fair [4]/outstanding	657
79	190/Win 98	satisfactory	inexpensive	good	[3]	good [4]/outstanding	658
78	182/Win 98	good	average	good	[3]	good [4]/good	659
74	198/Win NT 4.0	satisfactory	very inexpensive	satisfactory	[3]	good [4]/outstanding	660
73	188/Win 98	good	average	good	[3]	fair [4]/good	661
73	170/Win 98	satisfactory	inexpensive	satisfactory	fair	fair/good	662
72	184/Win 98	satisfactory	inexpensive	good	[3]	fair [4]/good	663
71	185/Win 98	satisfactory	expensive	good	good	good/fair	–
69	190/Win 98	satisfactory	average	good	good	fair/good	664
Scorecard weightings ▶		Features 25 percent	Price 22 percent	Performance 18 percent	Reliability 15 percent	Quality/policies 10 percent each	

[1] Insufficient data to give a rating, or the rating is derived from the vendor's Reliability and Service survey scores for its home PCs.

[4] Due to insufficient data from the Reliability and Service survey for the vendor's work PCs, this rating is derived from anonymous support quality calls, from survey scores for the vendor's home PCs, or from both.

This Month's Best Buys

1 QUANTEX QP6/400 M-1C

PRO: Fast and very well appointed for a budget PC

CON: None major

PC hunters looking for a budget small-office/home-office system will be hard-pressed to do better than Quantex's new Celeron-400 PC. The $1499 midsize tower is fast and bears features commonly found on much higher-priced systems. The QP6/400 M1-c's PC WorldBench score of 198 means that only a handful of PCs on the chart run productivity apps faster—and most of those systems cost hundreds of dollars more.

The controls on the spacious Quantex XP190N 19-inch monitor are intuitive and easy to use. The unstinting software bundle includes Corel WordPerfect Suite 8 and reference titles such as Compton's World Atlas and American Heritage Talking Dictionary. The system also comes with an Iomega Zip drive and a 4.8X DVD-ROM drive with software decoder.

If you need to call tech support for help, Quantex's support policies are fairly standard. You can reach technicians 24 hours a day, and the company backs its system with a three-year parts and one-year labor warranty. An easy-to-follow system manual and a foldout illustrated setup guide accompany the QP6/400 M-1c. Respondents in our latest Reliability and Service survey gave Quantex's home PCs good ratings in both of these categories.

Quantex QP6/400 M-1c

2 GATEWAY GP6-400

PRO: Fast and feature-rich, good documentation, Company has high system reliability and support

CON: Pricey for a budget system

Once of interest only to corporations, networked PCs are becoming increasingly popular in small and home offices—and the GP6-400 fits in quite well there. Though fairly expensive at $1718, it delivers speed, features, and expandability.

In our PC WorldBench 98 tests, the GP6-400 scored well above average for a PII-400 system with 64MB of RAM. The system also sports both a 3Com Fast EtherLink adapter and a Zip drive, and Gateway backs everything with a three-year warranty on parts and labor and solid support policies. The PC is no problem to upgrade, either. We easily opened its case by hand-turning two thumbscrews; inside we found four free expansion slots (one shared ISA/PCI and three PCI) and four open drive bays, even with the Zip drive in place.

Gateway GP6-400

Though the GP6-400's Ensoniq 3D Blaster Banshee graphics adapter can't support resolutions as high as the ATI 3D Rage Pro can handle, its top setting of ▶

PHOTOGRAPHS: KEN SMITH

TOP 20 BUDGET DESKTOPS — STANDARD FEATURES

	SYSTEM [1]	CPU	Operating system	RAM (MB)	Level 2 cache (KB)	Hard drive (GB)	Graphics adapter (AGP)	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	56-kbps modem protocol
1	Quantex QP6/400 M-1c*	Celeron-400	Windows 98	128	128	13	STB Velocity 4400	16/SGRAM	19/17.7	V.90
2	Gateway GP6-400*	Pentium II-400	Windows 98	64	512	13	Ensoniq 3D Blaster Banshee	16/SGRAM	17/16	not included
3	Gateway E-1200 366*	Celeron-366	Windows 98	64	128	8.4	integrated ATI 3D Rage IIC	4/SGRAM	17/15.8	not included
4	CyberMax Entrepreneur C-400*	Celeron-400	Windows 98	64	128	6.2	Joy Tech Apollo 7400	8/SDRAM	17/15.7	V.90
5	Quantex QP6/400 M-4x SE*	Pentium II-400	Windows 98	128	512	13.6	Diamond Stealth II G460	8/SDRAM	19/18	V.90
6	Sys TaskMaster Z366C	Celeron-366	Windows 98	64	128	6.4	Eon Lilith Banshee	16/SGRAM	17/15.7	V.90
7	Xi Computer 400A MTower SP	Celeron-400	Windows 98	128	128	14	Matrox Mystique G200	8/SDRAM	17/16	V.90
8	Micro Express MicroFlex-PII/450LC	Pentium II-450	Windows NT 4.0	128	512	9.5	Diamond Monster Fusion	16/SGRAM	19/17.7	V.90
9	CyberMax Enthusiast KII-400R	AMD K6-2-400	Windows 98	64	512	10	STB Velocity 4400	16/SDRAM	19/18	V.90
10	Axis Systems Orion 100C DVD	Pentium II-450	Windows 98	128	512	8.4	Intel 740	8/SDRAM	17/15.8	V.90
11	IDot.com 366LXA	Celeron-366	Windows 98	64	128	6.4	Card Expert Intel 740	8/SDRAM	17/16	V.90
12	Micro Express MicroFlex-4A	AMD K6-2-400	Windows 98	64	1024	10	Diamond Monster Fusion	16/SGRAM	19/17.9	V.90
13	MidWest Micro Office MWO-433C	Celeron-433	Windows 98	64	128	8.4	integrated ATI 3D Rage Pro	8/SDRAM	17/16	V.90
14	Xi Computer 333A MTower	Celeron-333	Windows 98	64	128	14	Matrox Millennium G200	8/SGRAM	17/16	V.90
15	Axis Systems Metropolis NX5-333C	Celeron-333	Windows NT 4.0	64	128	4.3	Intel 740	8/SDRAM	17/15.7	not included
16	CompUSA American Pro 366	Celeron-366	Windows 98	64	128	13.5	STB Velocity 4400	16/SDRAM	17/15.6	V.90
17	Compaq Prosignia Desktop 310	Celeron-366	Windows 98	64	128	10	Diamond Viper V330	4/SGRAM	17/16	V.90
18	IDot.com AMD K6-2-400	AMD K6-2-400	Windows 98	64	1024	10.1	Card Expert Intel740	8/SDRAM	17/15.9	V.90
19	IBM 300 GL Small Business Series	Pentium II-400	Windows 98	64	512	8.4	integrated S3 Trio 3D	4/SGRAM	17/15.8	V.90
20	Micron Millennia C400	Celeron-400	Windows 98	64	128	13	integrated NVidia RIVA 128zx	8/SGRAM	17/15.9	V.90

* Best Buy

[1] Configuration as tested. Vendor may have since changed components.

[2] *PC World* defines towers as taller than 20 inches, midtowers as 15.5 inches to 20 inches, and minitowers as shorter than 15.5 inches.

[3] Six years on CPU and main RAM, three years on other parts.

1280 by 1024 looks respectable on Gateway's 17-inch EV700 monitor. The GP6-400 now ships with a 13GB hard disk (replacing the 10.1GB version)—capacious for a budget PC. The software bundle of McAfee AntiVirus and Microsoft's Office 97 Small Business Edition with Bookshelf offers resources that any small business will welcome. In our recent reader survey, Gateway's work PCs received good rankings for both reliability and service.

3 GATEWAY E-1200 366

PRO: Very inexpensive, easy to manage and use

CON: So-so performance, smallish hard drive, very limited expandability

Just when you thought it couldn't get any cheaper, Gateway's E-1200 366 sheds another $221. This Celeron-366 compact desktop system emphasizes ease of use and service. Its $1029 price is outstanding for any PC, much less for a network-ready model equipped with an ethernet adapter.

But make sure your office's computing needs are modest. As its PC WorldBench 98 score of 177 indicates, the E-1200 is slow even for its processor class, and some of its features are merely adequate. For instance, the 8.4GB hard drive seems skimpy compared to those of other bargain PCs these days; and while most budget systems now offer 8MB or 16MB of video RAM, the integrated ATI 3D Rage IIC adapter on this Gateway has just 4MB of SGRAM. Still, if your work consists mostly of low-demand spreadsheet, database, and word processing applications, the E-1200 366 is ideal.

Gateway E-1200 366

You can get inside the system in seconds—just twist a screw a few times with your hand, and then press two buttons to release the cover. A clean and tidy layout awaits you inside. All ports on the back of the PC are labeled and color-coded.

The system's documentation exceeded our expectations, too. Along with an illustrated, foldout setup guide, Gateway includes a clearly written system manual, a troubleshooting guide, and a booklet for new users. If you can't find the answer you need there, try Gateway's 24-hour support line. Reps answered our anonymous calls

		EXPANDABILITY					CUSTOMER SUPPORT			
CD/DVD-ROM drive speed	Sound board	Case style [2]	Max. RAM (MB)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
4.8X DVD-ROM	Sound Blaster Audio PCI64	midtower	384	1	2/3	4	3/1	24	Sat, Sun	BBS, WWW
13X-32X	integrated Sound Blaster Audio	midtower	384	2	2/2	4	3/3	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
13X-32X	integrated Crystal Audio	compact	256	1	1/1	2	3/3	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
20X-40X	Sound Blaster PCI128	tower	384	2	2/3	3	3/1	24	Sat, Sun	BBS, WWW
4.8X DVD-ROM	Sound Blaster Audio PCI64	midtower	384	1	2/3	4	3/1	24	Sat, Sun	BBS, WWW
14X-32X	Sound Blaster AWE64	midtower	1024	3	3/2	4	varies [3]/5	24	Sat, Sun	WWW
4X DVD-ROM	Sound Blaster PCI128	midtower	384	2	3/2	4	3/3	24	Sat, Sun	WWW
14X-32X	Sound Blaster PCI128	midtower	768	1	3/0	4	4/4	24	Sat, Sun	WWW
4.8X DVD-ROM	Aureal A3D 64V	midtower	256	1	2/3	3	3/1	24	Sat, Sun	BBS, WWW
4.8X DVD-ROM	Sound Blaster PCI128	midtower	384	2	3/0	4	3/3	24	Sat, Sun	WWW
17X-40X	Aztech PCI 338A-3D	midtower	384	2	3/0	4	varies [4]/1	24	Sat, Sun	WWW
4.8X DVD-ROM	Sound Blaster PCI128	midtower	384	4	3/0	3	4/4	24	Sat, Sun	WWW
17X-40X	integrated Yamaha 740 PCI	midtower	768	2	3/1	2	varies [3]/3	24	Sat, Sun	BBS, WWW
20X-40X	Creative Ensoniq AudioPCI	midtower	768	2	3/2	4	3/3	24	Sat, Sun	WWW
14X-32X	Creative Ensoniq AudioPCI	midtower	384	2	3/0	4	3/3	24	Sat, Sun	WWW
17X-40X	Sound Blaster Live	midtower	768	2	2/1	3	varies [5]/1	24	Sat, Sun	WWW
14X-32X	Compaq Premiere Labs	midtower	256	1	1/1	3	3/1	24	Sat, Sun	AOL, BBS, CIS, Prodigy, WWW
17X-40X	Turtle Beach Montego II PCI	midtower	768	2	3/0	4	varies [4]/1	24	Sat, Sun	WWW
14X-32X	integrated ESS Solo-1 PCI Audio	minitower	384	2	0/0	2	3/1	24	Sat, Sun	AOL, BBS, CIS, WWW
4.8X DVD-ROM	integrated ESS Maestro2 PCI	midtower	256	1	1/0	2	varies [4]/1	24	Sat, Sun	BBS, CIS, WWW

[4] Five years on CPU and main RAM, three years on other parts.

[5] One year on monitor, three years on other parts.

within 5 minutes and responded courteously and accurately to all our questions—even the tricky ones. Gateway backs its PCs with a three-year parts and labor warranty. Respondents to our Reliability and Service survey rated Gateway's work PCs as good in both categories.

4 CYBERMAX ENTREPRENEUR C-400

PRO: Very affordable, includes Zip drive

CON: Monitor is a tad fuzzy at high resolutions, vendor's system reliability rates as only fair

The lowdown on CyberMax's latest: It's a nicely equipped small-business PC at a miser's price. The Entrepreneur Celeron-400 delivers solid performance and features for a mere $1199, earning it the fourth-place Best Buy on our chart. The only thing about the PC that gives us pause is the reliability rating of the vendor's systems. In our survey of subscribers who use CyberMax home PCs, the company earned a rating of fair. CyberMax's service, on the other hand, is rated as good—second only to Dell's.

CyberMax Entrepreneur C-400

The Entrepreneur C-400 clocked in with a PC WorldBench 98 score of 188—average for a system with a Celeron-400 CPU and 64MB of RAM. The PC's sturdy tower case is a bit taller than most, but the included components are mostly standard issue. Still, CyberMax does add a Zip drive that lets you use removable 100MB floppy-size disks—a nice plus. Robust multimedia features on the Entrepreneur include a 20X–40X CD-ROM drive and a pair of Altec Lansing ACS45 speakers. Most users should enjoy the sound; we found it a bit bass-heavy, but the speakers deliver adequate audio fidelity for music CDs.

The CX700S 17-inch monitor provides a great picture at 800 by 600 resolution, with bright, realistic colors and sharp text. At 1024 by 768, however, the text gets slightly fuzzy. With Microsoft Office 97 Small Business Edition and several titles for business planning and project management bundled in the package, you'll be able to get to work as soon as you set up the system. That shouldn't be difficult, since the manuals are clearly and con- ▶

cisely written. CyberMax deserves high marks for its excellent documentation.

Getting inside the case is a painless experience. The interior is well organized, and the five open drive bays and three unoccupied expansion slots give you plenty of room to upgrade. In our anonymous calls to CyberMax's support line, technical reps were generally helpful. The company backs its PCs with warranties of three years on parts and one year on labor, as well as around-the-clock support.

5 QUANTEX QP6/400 M-4X SE

PRO: Good expandability, extensive features

CON: Average performance for its CPU class, on the expensive side

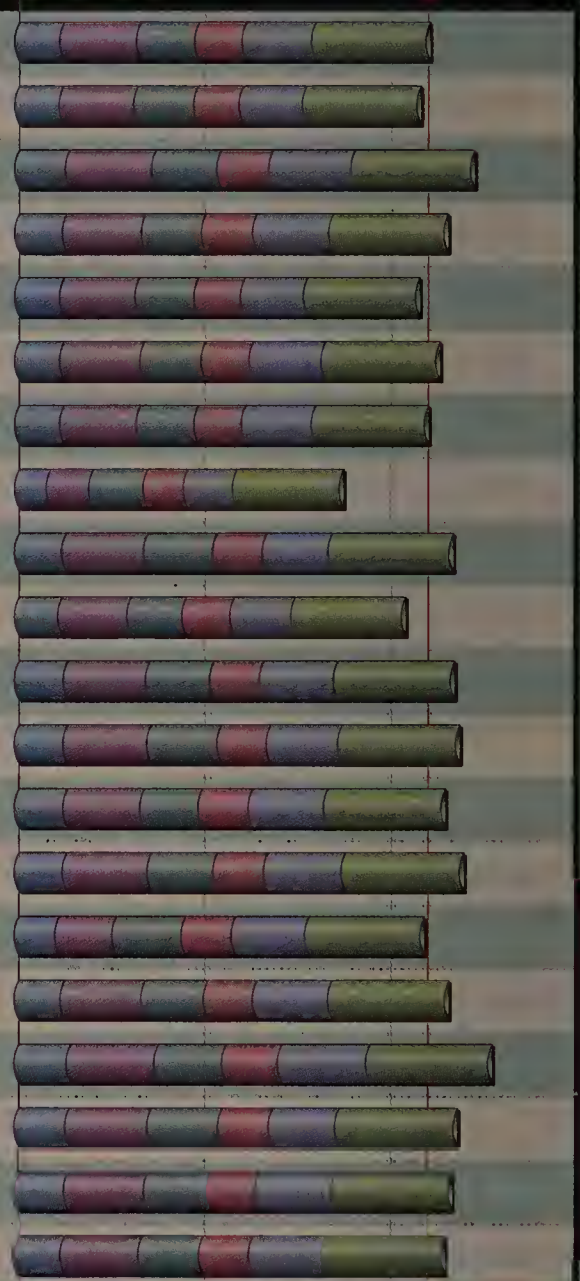
A good choice for any user with multimedia needs, this $1749 Quantex comes outfitted with an Iomega Zip drive, a 19-inch monitor, a 4.8X DVD-ROM drive, and management features. Though the M-4x SE is part of Quantex's Value Multimedia line, its price is the second-highest among all PCs on this month's chart. The M-4x SE's PC World-Bench 98 score of 203 is close to the mean for the 11 similarly configured PII-400 PCs we've tested.

Quantex QP6/400 M-4x SE

Corporate users may appreciate the included Desktop Management Interface, but you'll have trouble taking advantage of this feature without an integrated ▶

TOP 20 BUDGET DESKTOPS — TEST REPORT

	SYSTEM	CPU	Operating system	RAM (MB)	Level 2 cache (KB)	PC World-Bench 98 score
1	Quantex QP6/400 M-1c*	Celeron-400	Win 98	128	128	198
2	Gateway GP6-400*	Pentium II-400	Win 98	64	512	203
3	Gateway E-1200 366*	Celeron-366	Win 98	64	128	177
4	CyberMax Entrepreneur C-400*	Celeron-400	Win 98	64	128	188
5	Quantex QP6/400 M-4x SE*	Pentium II-400	Win 98	128	512	203
6	Sys TaskMaster Z366C	Celeron-366	Win 98	64	128	193
7	Xi Computer 400A MTower SP	Celeron-400	Win 98	128	128	199
8	Micro Express MicroFlex-PII/450LC	Pentium II-450	Win NT 4.0	128	512	256
9	CyberMax Enthusiast KII-400R	AMD K6-2-400	Win 98	64	512	187
10	Axis Systems Orion 100C DVD	Pentium II-450	Win 98	128	512	210
11	IDot.com 366LXA	Celeron-366	Win 98	64	128	185
12	Micro Express MicroFlex-4A	AMD K6-2-400	Win 98	64	1024	183
13	Midwest Micro Office MWO-433C	Celeron-433	Win 98	64	128	190
14	Xi Computer 333A MTower	Celeron-333	Win 98	64	128	182
15	Axis Systems Metropolis NX5-333C	Celeron-333	Win NT 4.0	64	128	198
16	CompUSA American Pro 366	Celeron-366	Win 98	64	128	188
17	Compaq Prosignia Desktop 310	Celeron-366	Win 98	64	128	170
18	IDot.com AMD K6-2-400	AMD K6-2-400	Win 98	64	1024	184
19	IBM 300 GL Small Business Series	Pentium II-400	Win 98	64	512	185
20	Micron Millennia C400	Celeron-400	Win 98	64	128	190



*Best Buy

Word 97 | Word Pro 97 | Excel 97 | 1-2-3 97 | Paradox 8.0 | Picture Publisher 7.0

TEST PC WORLD CENTER **HOW WE TEST** All systems are tested with PC World8ench 98, *PC World*'s application-based benchmark. A higher PC World8ench score is better. All PCs are tested with Windows 95, Windows 98, or Windows NT 4.0, and video resolution is set to 800 by 600 in 65,536 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC World8ench 98 score is a sum of the weighted, normalized result of each script: Word 97 (10 percent), Word Pro 97 (10 percent), Excel 97 (20 percent), 1-2-3 97 (20 percent), Paradox 8.0 (20 percent), and Picture Publisher 7.0 (20 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing). [1]Under Windows 98 with 64MB of RAM; also includes systems tested in this and previous months that do not currently rank among the Top 20.

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ethernet card; our test PC came with a V.90 modem instead. On the plus side, Quantex tacked on the business-savvy 8MB Diamond Stealth II G460 graphics card, which features tools for customizing your desktop. (For example, you can create shortcut keys or bring up the Start menu by clicking anywhere on the desktop.) The system's Altec Lansing ACS45 speakers offer impressive sound quality, with wide-ranging highs and lows.

A look inside the M-4x SE's case reveals a well-organized interior with lots of room to grow, including two externally accessible and three internal open drive bays, and four open slots—a generous allotment considering that the system already carries a preinstalled Zip drive. The software bundled with the system includes Corel's WordPerfect Suite 8.

Quantex warrants its desktop systems for three years on parts and one year on labor, and provides around-the-clock toll-free technical support. In our most recent reader survey, the company's home systems received good ratings for both reliability and service.

New This Month

The following systems made our Budget Desktops chart for the first time this month. For brief reviews of previously tested machines on the chart, visit PC World Online (www.pcworld.com/top400).

7 XI COMPUTER 400A MTOWER SP

PRO: Great speed for a Celeron-400 PC

CON: Poor documentation

Small-business users in need of snappy performance at a price that won't break the bank will like Xi Computer's new $1499 MTower SP. With a PC WorldBench score of 199, this Celeron-400 PC ranks among the fastest sub-$1500 machines we've encountered—and the very fastest Celeron-400 PC we have examined to date. The MTower SP comes well configured, too, with high-end components like a 13.8GB hard disk, a 4X DVD-ROM drive, and a bright 17-inch monitor that displays crisp, vivid images. The Altec Lansing ACS45 speakers and subwoofer deliver full-bodied sound with real punch. The Keytronic keyboard feels comfortable and quiet. Thrown into the mix at this great sticker price is Microsoft Office 97 Small Business Edition.

Xi 400A MTower SP

This tallish midsize tower looks like any other beige computer except for the inclusion of a sliding plastic cover, ostensibly to protect the floppy, DVD-ROM, and expansion drives from dust. Unfortunately, this innovation proved to be more of a nuisance than a nicety: Ours was difficult to slide down when we needed to access drives; and because the cover doesn't lock, it proved more convenient to leave ajar than to close up. We had to undo a couple of screws to loosen the case's side panels, but then the panels slid off easily to reveal a clean, tidy interior that afforded us ready access to the slots and bays.

MicroFlex-PII/450LC

Documentation was the only major disappointment in the MTower. We found only separate manuals for the components, and many of those contained excessively technical language. MTower owners would benefit from a general user guide—as matters stand now, many new users may simply resort to calling support when they run into problems setting up their PC. (Xi says it intends to beef up the system documentation in the near future.) Fortunately, support representatives are available around the clock; in our recent anonymous calls, Xi Computer's reps proved courteous and knowledgeable.

8 MICRO EXPRESS MICROFLEX-PII/450LC

PRO: Terrific performance, good expandability

CON: Substandard monitor, no software bundle

If you need to keep an eye on your budget yet want a fast and well-appointed system for your home office, consider Micro Express's MicroFlex-PII/450LC. One of only two PCs on the budget chart built around a Pentium II-450 CPU, this $1599 Windows NT system chalked up an impressive PC WorldBench 98 score of 256.

The system's components aren't top-notch, but they're more than adequate for business apps and casual gaming. This MicroFlex is one of a handful of PCs on the chart to come with a spacious 19-inch monitor. However, the Impression 9VX display included with our unit looked better on the spec sheet than it did on a work surface, where colors and images appeared just a bit washed out and fuzzy. The 4-cubic-inch Altec Lansing ACS44 speakers and subwoofer delivered surprisingly full, rich sound at moderate volumes. Unfortunately, the MicroFlex lacks a software bundle.

You'll need a screwdriver to remove the system's case cover, but it slides off easily and reveals a neatly organized interior that provides clear access to all slots and bays. We found plenty of room to grow, too—four open slots and three externally accessible drive bays. Micro Express backs the system with a long four-year warranty on parts and labor and provides around-the-clock technical support. But in our anonymous calls to the company's support line, we found the representatives' manner abrupt and standoffish.

13 MIDWEST MICRO OFFICE MWO-433C

PRO: Attractive price, outstanding warranty and support, SuperDisk drive

CON: Unimpressive performance by the very latest Celeron CPU, a few design nitpicks

Here's an affordable SOHO system with a couple of twists we'd like to see more often. Twist one: MidWest Micro's $1299 Office MWO-433C includes a SuperDisk drive that (unlike the faster and more widely adopted Zip drive) also accepts regular floppy disks. Twist two: The company includes Microsoft's Natural Keyboard, which is designed to match the way people naturally hold their hands and arms while typing. We found that it works fairly well, provided that you can adapt to the curved configuration of the keys. ▶

MidWest Micro Office MWO-433C

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The MWO-433C is the first Celeron-433 PC we've tested for the Top 20, but it's probably not the best showcase for the latest Celeron chip. Running Windows 98, this PC scored only 190 in our PC WorldBench 98 performance tests—a nominal 4 percent improvement over the average Celeron-366 system.

The 17-inch ClearMax monitor bundled with this system generates crisp, clear images. Both text and graphics are readable at several different resolutions, and monitor controls are intuitive and easy to use. The compact Altec-Lansing ACS44W speakers deliver clean and full sound. MidWest Micro also throws in Microsoft Office 97 Small Business Edition and Microsoft Streets 98, a mapping program.

Unfortunately, the Office MWO's design is a mixed bag. The case's slightly rounded top makes it an unstable shelf to place objects on—a clear sacrifice of convenience for the sake of style. The PC's side panel doesn't require screws, but it definitely takes some futzing to get on and off, and you have to press hard on the big slide locks to secure the panels. Nonetheless, the spacious, uncluttered interior invites quick access to the four open drive bays and two free slots. The case is built like a tank, with no flex, and the color-coded cables and ports make setting up the system a breeze.

IDot.com AMD K6-2-400

Even new users should be happy with the Office MWO's documentation. It ships with separate manuals for the components but also comes with a general user manual written in plain English and bolstered by lots of diagrams. Support policies are excellent, including a six-year warranty on the CPU and main RAM, and around-the-clock phone support. In our anonymous calls, MidWest Micro's technical support reps gave us good, accurate responses to our test questions.

18 IDOT.COM AMD K6-2-400

PRO: Low cost, good picture quality on monitor

CON: Quality of technical support could be better, no software bundle

Nothing about IDot.com's new $1299 AMD K6-2-400 will knock your socks off, but it's an all-around solid midsize tower with a price that's low enough to let it squeak onto the chart.

It's actually the 17-inch Momenta Technology DRMON17 monitor that stands out on this system. Colors and text are bright and crisp, and small images, such as icons on a Windows taskbar, look sharp even at 1024 by 768 resolution. We also found the on-screen controls easy to use.

Running an Advanced Micro Devices K6-2-400 processor, the IDot.com system scored 184 in our PC WorldBench 98 tests—close to the average for PCs in this price range, and indistinguishable from the performance of PCs equipped with Celeron-400 chips. The other components—64MB of RAM, a 10.1GB hard drive, and a 17X–40X CD-ROM drive—are standard budget PC fare.

Future upgrades should be easy enough to perform. To get inside the box, you simply squeeze two latches on the two sides of the PC and slide off the sturdy case. The IDot.com's uncluttered interior gives you obstruction-free access to expansion card slots and memory sockets, and the computer's well-written and nicely illustrated documentation makes the job easier still. Unfortunately, the PC ships without any software bundle at all.

IDot.com backs its PCs with a three-year warranty on most parts (five years on the CPU and main RAM) and a one-year warranty on labor, as well as around-the-clock support. In our anonymous calls to support, we received adequate service. Representatives gave us accurate but brief answers and seemed reluctant to troubleshoot our problems. Hold times ranged from 15 to 20 minutes.

20 MICRON MILLENNIA C400

PRO: Attractive design

CON: Limited expandability, poor-quality audio system and monitor

Micron's new Millennia C400 has to be classified as a bit of a disappointment. Maybe we've gotten spoiled by some great recent bargains from this vendor in the small-business category, but this particular offering failed to bowl us over.

The Millennia C400's $1525 street price is pretty much in line with what you get, and its PC WorldBench 98 score of 190 is a negligible 2 percent higher than the average for Celeron-400 PCs carrying 64MB of RAM. Colors appeared somewhat faint on the 17-inch Micron 700 Vx monitor included with our test PC; both graphics and text lacked sharpness. Sound from the Advent AV009 speakers and subwoofer also seemed a bit muffled, as if the speakers were underwater. The 13GB hard drive included with this Millennia is reasonably large for this price.

Micron Millennia C400

The Millennia itself is handsome: The gray midsize tower has a little stand in front so the whole case angles up and the top and sides have sleek, curved edges. It's functional, too. The case comes off easily without a screwdriver, and the interior is neatly organized and clutter-free. Too bad you get only two open slots and one free drive bay. The PC ships with Microsoft's Office 97 Small Business Edition.

In our latest reader survey, Micron's work PCs earned a good rating for reliability and a fair one for service. Our latest anonymous calls to the company's technical support revealed knowledgeable reps and improved service.

If you've made up your mind that you must have a Micron, you'll probably be better served by investing a bit more money in a higher-end system that really delivers the goods. ▶

BEYOND THE TOP 20

online

We evaluated the following systems along with the others, but they didn't score high enough to reach the Top 20 Budget Desktops chart. For write-ups, go to PC World Online (www.pcworld.com/t20pcs).

- Acer Power 6100-350B
- CyberDyne Micro Centron K6-2 XCP Series
- LLS AMD D6-2-400
- NEC PowerMate VT300
- PowerSpec 4630 Celeron 400
- Sys TaskMaster Z-333C
- Umax PC PIII-454EZV

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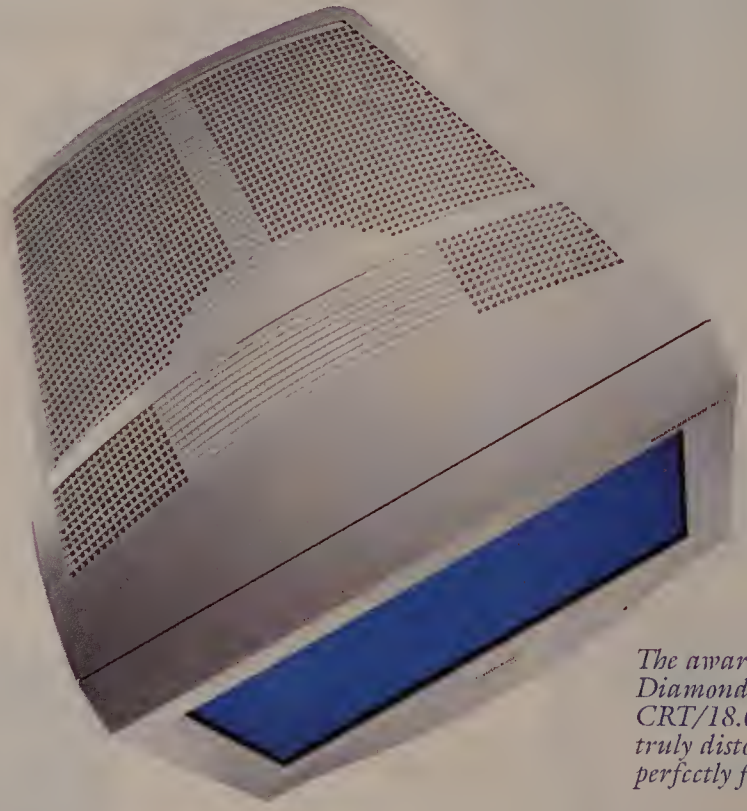

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Diamond Pro 900u
March 1999

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February 1999

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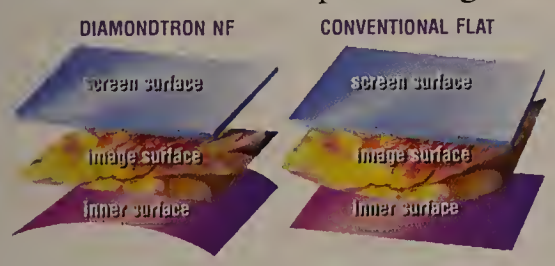

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PC WORLD

TOP 10 NOTEBOOK PCs

	POWER NOTEBOOK	Last month	Month tested	Street price (3/19/99)	CPU	Comments
1	Dell Latitude CPi A366XT 800/388-8542 www.dell.com	1	May 99	$3198	Pentium II-366	$50 off this thin corporate laptop from vendor with great reliability; no modem.
2	Gateway Solo 5150LS 800/315-2536 www.gateway.com	2	Apr 99	$3159	Pentium II-366	Desktop replacement sports a big 14.1-inch screen and a DVD-ROM drive.
3	Dell Inspiron 7000 A366LT 800/388-8542 www.dell.com	3	Apr 99	$3529	Pentium II-366	Very heavy notebook with 15-inch screen and DVD-ROM drive is a speedster.
4	IBM ThinkPad 560Z BOU 800/426-7255 www.ibm.com/pc/us/thinkpad	n/a	Feb 99	$2899	Pentium II-300	$600 price cut on thin and light travel notebook; CD-ROM drive not included.
5	Toshiba Satellite 4080XCDT 800/867-4422 www.toshiba.com	4	May 99	$3199	Pentium II-366	Very good audio and large 14.1-inch screen distinguish this multimedia unit.
	BUDGET NOTEBOOK					
1	Dell Inspiron 3500 C300XT 800/388-8542 www.dell.com	2	Apr 99	$2099	Celeron-300	$130 off very fast notebook; vendor's system reliability is tops.
2	Gateway Solo 2500SE 800/315-2536 www.gateway.com	n/a	NEW	$2144	Pentium II-300PE	Fastest notebook on budget chart also boasts fantastic battery life.
3	HP OmniBook XE 800/752-0900 www.hp.com	3	May 99	$1899	Pentium II-266PE	Laptop offers good battery life and speed at an affordable price.
4	AMS Tech Roadster 15CTA 800/886-2671 www.amstech.com	5	Jan 99	$1295	AMD K6-2-300	Cheapest notebook on chart has bright screen and a three-year warranty.
5	Transmonde Vivanté SE 2300 888/988-2883 www.transmonde.com	n/a	Nov 98	$1649	Pentium II-300	Solid-performing desktop alternative is a good choice for first-time buyers.

Best Buy See features chart, page 258.

n/a = not applicable

[1]Includes computer; adapter; power cord; and floppy, DVD-ROM, or CD-ROM drive.

[2]For more about products here, select the number on the product information card or visit www.pcworld.com/productinfo.

DESKTOP PCs have gotten dirt cheap, and until recently it looked as if we'd soon have our pick of sub-$1000 notebooks, too. Top-of-the-line portables have dropped about a grand in price—from a ceiling above $4000 two years ago to a little more than $3000 today. And many low-end models cost less than $1500. A few companies, such as WinBook, sell no-frills notebooks for $999 or less.

But industry watchers don't expect full-featured notebooks priced under $1000 to become widely available for at least another year or two. After a long period of overproduction, materials for making LCD panels have become more scarce due to the Asian economic crisis and the growing popularity of bigger displays. The result: Notebook makers must pay Japanese and Korean suppliers more for screens and pass that extra expense on to consumers.

"Screen prices have gone up about 10 percent," notes Ken Delaney, an analyst for the Gartner Group, a market research firm. Delaney predicts that this development will flatten notebook prices for the next two years. Meanwhile, consumer demand is increasing not only for notebook screens that measure 13, 14, and 15 inches, says Delaney, but also "for LCD screens in the desktop market."

Prices on notebooks from some vendors are likely to keep sinking, but more slowly than in the recent past. According to Tony Grasso, Gateway's product marketing manager for home portables, "You're looking at [cuts] of perhaps $100 or $200 every few months, instead of hundreds of dollars."

THINKPAD PRICE PLUMMETS

THE SCREEN SHORTAGE seems to be affecting prices on our Top 10 notebooks list already. AMS's $1295 Tech Roadster 15CTA, for instance, has shed only $200 since it first appeared on our budget chart in January. And after making the power chart in April, Gateway's Solo 5150LS has actually gone up in price a tad.

A dramatic exception, IBM's ThinkPad 560Z BOU makes our list for the first time after a huge $600 cut. Even with the reduction, this thin, 5.8-pound PII-300 travel notebook costs a hefty $2899, and that's not including the optional $390 external CD-ROM drive. But the lower price propels it to a respectable fourth place on our power chart.

Of the nine new notebooks we evaluated this month, only one nabbed a niche on the Top 10. Gateway's Solo 2500SE, an all-around fine machine for personal or small-business use, lands in second place on the budget chart, behind the Dell Inspiron 3500 C300XT. The Pentium II-300PE–based Gateway runs faster and costs $270 more than last month's now-discontinued budget Best Buy, which was also called the Gateway Solo 2500SE but came equipped with a Celeron-266 CPU.

PHOTOGRAPHS: KEN SMITH

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SCORECARD

★ Overall rating	PC WorldBench 98 score/performance	Price	Vendor's system reliability	Features and design	Vendor's support quality/policies	Battery life (hours:min)/rating	Traveling weight [1]	Product info number [2]
86	184/very good	average	outstanding	good	good/good	2:15/satisfactory	light	–
86	186/very good	average	good	very good	good/fair	2:50/good	average	665
82	191/outstanding	expensive	outstanding	very good	good/fair	3:24/good	unacceptable	–
82	159/good	average	good	good	good/fair	3:10/good	light	–
82	184/very good	average	fair	very good	fair/fair	2:35/satisfactory	average	666
Power scorecard weightings ▶	**Performance 22 percent**	**Price 14 percent**	**Reliability 22 percent**	**Features 16 percent**	**Support 10 percent**	**Battery life 8 percent**	**Weight 8 percent**	
88	160/outstanding	expensive	outstanding	very good	good/good	2:45/satisfactory	average	–
88	165/outstanding	expensive	good	very good	good/fair	5:08/outstanding	average	667
85	154/very good	average	good	very good	good [3]/poor	3:01/good	average	668
82	122/satisfactory	very inexpensive	[4]	good	good [3]/fair	2:35/satisfactory	average	669
81	157/very good	average	[4]	good	good [3]/worst	2:43/satisfactory	average	670
Budget scorecard weightings ▶	**Performance 14 percent**	**Price 22 percent**	**Reliability 22 percent**	**Features 16 percent**	**Support 10 percent**	**Battery life 8 percent**	**Weight 8 percent**	**All products: 905**

[3] Due to insufficient data from survey, score is based on responses to anonymous calls for tech support.

[4] Insufficient data to give a rating.

This Month's Best Buys

POWER NOTEBOOKS

1 DELL LATITUDE CPI A366XT

PRO: Relatively thin and light, fast, vendor's reliability and support marks rank among the best

CON: Shorter-than-average battery life, no internal modem, few multimedia extras

This 7-pound corporate notebook combines a fairly thin, stylish case with snappy Pentium II-366 performance and good vendor reliability and support ratings to claim our power Best Buy for the second month in a row.

A PC WorldBench 98 score of 184 puts the $3198 A366XT among the fastest notebooks we've tested. It's also versatile, accepting a range of thin devices in its modular bay. As an alternative to holding the included 10X–24X CD-ROM drive, the floppy drive, or a weight-saving empty module, the bay can accommodate any one of several extra-cost options, including a second battery ($169), a second hard drive up to 6.4GB in size ($499), or an LS-120 removable storage drive ($199). All of the bay's devices, as well as the optional docking stations (for $349 and $649), can be shared across the Latitude CPi notebook line, according to Dell.

With a handsome dark-gray case and neatly stylized touchpad and mouse buttons, the A366XT radiates an understated business chic. A wrist rest slightly thicker than the other parts of the notebook allows your hands to float comfortably over the nicely laid-out keyboard. The A366XT's battery, CD-ROM drive, and floppy drive slide out easily. RAM is also readily accessible from the bottom of the unit, but you'll need a screwdriver to remove the 6.4GB hard drive. If you frequently work with spreadsheets while on the road, you can squeeze a little more viewable area out of the A366XT's 13.3-inch screen by setting the resolution to 1280 by 1024 and enabling the pan mode.

Dell's Latitude CPI A366XT has a thin 1.6-inch profile.

Geared strictly toward corporate buyers who put a premium on long-term configuration stability, the A366XT lacks a number of multimedia extras (such as advanced video options) that high-end notebooks now routinely provide. But Dell has begun offering a DVD-ROM drive option for the Latitude CPi line.

Dell's support policies for its Latitude line are among the best in the industry. They include 24-hour toll-free support lines, a three-year parts warranty, and one year of free on-site service. The two weak links here are a skimpy one-year labor warranty and provision of printed documentation only upon request.

Dell consistently draws high praise from *PC World* readers for the quality of its technical support. It may be slipping, however. Lately, we've encountered long waits to talk with support technicians and received inconsistent advice from staffers during our anonymous calls. ▶

TOP 10 NOTEBOOK PCs — STANDARD FEATURES

	POWER NOTEBOOK	CPU	Traveling weight (pounds)[1]	RAM (MB)	Hard drive (GB)	Color screen type	Screen diagonal (inches)	Screen resolution	Maximum screen colors	Battery type	Pointing device
1	Dell Latitude CPi A366XT*	Pentium II-366	7	64	6.4	active	13.3	1024 x 768	16.8 million	lithium ion	touchpad
2	Gateway Solo 5150LS	Pentium II-366	7.7	64	6.4	active	14.1	1024 x 768	16.8 million	lithium ion	touchpad
3	Dell Inspiron 7000 A366LT	Pentium II-366	10.4	64	8	active	15	1024 x 768	16.8 million	lithium ion	touchpad
4	IBM ThinkPad 560Z BOU	Pentium II-300	5.8	64	6.4	active	12.1	800 x 600	16.8 million	lithium ion	eraserhead
5	Toshiba Satellite 4080XCDT	Pentium II-366	7.8	64	6.4	active	14.1	1024 x 768	16.8 million	lithium ion	eraserhead
	BUDGET NOTEBOOK										
1	Dell Inspiron 3500 C300XT*	Celeron-300	7.3	64	4.3	active	13.3	1024 x 768	16.8 million	lithium ion	touchpad
2	Gateway Solo 2500SE	Pentium II-300PE	8	64	4	active	12.1	800 x 600	262,144	lithium ion	touchpad
3	HP OmniBook XE	Pentium II-266PE	7.4	64	4	active	12.1	800 x 600	16.8 million	lithium ion	touchpad
4	AMS Tech Roadster 15CTA	AMD K6-2-300	7.9	32	2.1	active	12.1	800 x 600	16.8 million	NiMH	touchpad
5	Transmonde Vivanté SE 2300	Pentium II-300	8.4	64	4.1	active	13.3	1024 x 768	262,144	lithium ion	touchwriter

*Best Buy ● Yes ○ No [1]Includes computer; adapter; power cord; and floppy, DVD-ROM, or CD-ROM drive.

BUDGET NOTEBOOKS

1 DELL INSPIRON 3500 C300XT

PRO: Modular bay accepts range of devices, AGP graphics bus for peppy presentations

CON: Awkwardly placed AC adapter jack

High-quality business notebooks don't always cost upward of three grand. Consider the $2099 Dell Inspiron 3500 C300XT: This month the C300XT reclaims the budget Best Buy from its neck-and-neck nemesis, Gateway. The latest version of Gateway's Solo 2500SE, champing at the bit in second place, bests the C300XT in battery life and uses more on-board cache for greater speed. But the C300XT slips ahead with lighter weight, a bigger screen, and a better company reliability score.

Dell Inspiron 3500 C300XT

Compared to its bigger sibling—Dell's hulking 10.4-pound, $3529 Inspiron 7000 A366LT (in third place this month on our power chart)—the C300XT makes a better choice for the average business traveler or budget buyer. It's much thinner, lighter, and cheaper than its behemoth kin. And though the larger Inspiron does manage to turn in a much longer battery life, the C300XT endured for a tolerable 2 hours and 45 minutes in our tests.

The C300XT's modular bay accepts the same array of devices as its big brother—one at a time, of course. These include the bundled floppy and CD-ROM drives, and such extra-cost add-ins as a second battery ($119), a DVD-ROM drive ($249), and a Zip drive ($139). Only the location of the AC adapter connection, which Dell decided to group with all the audio jacks on the right side instead of isolating in back, struck us as an unwise design choice.

The C300XT has a comfortable keyboard and lets you reprogram its mouse buttons to launch applications. Dell's beautiful manuals and generous support policies, including around-the-clock toll-free phone lines and three-year warranties on parts and labor, complete the package.

New This Month

BUDGET NOTEBOOKS

2 GATEWAY SOLO 2500SE

PRO: Super battery, great sound, tons of software, on-board documentation, good tech support

CON: Boxy looking, not the lightest of portables

The Celeron-266–driven Gateway Solo 2500SE notebook, our number one budget portable last month, is no more. A new Celeron-300 unit (which we haven't reviewed) replaces it. But here's another option: a $2144 Pentium II-300 performance-enhanced version of the notebook.

With a slightly faster processor and twice as much level 2 cache, the new 2500SE earns a PC WorldBench 98 score of 165, 11 percent better than the last month's discontinued Celeron-266 Best Buy. It costs $270 more and comes with a smaller hard drive (4GB instead of 6.4GB), two factors that help knock it down to second place. But this 8-pound notebook with built-in CD-ROM and floppy drives is still a terrific portable.

Gateway appeals to home users by including a TV-out jack, headphones, and '98 editions of such home-office applications as Microsoft Money, Microsoft Home Essentials, Microsoft Encarta Encyclopedia, and Microsoft Greetings Workshop. The 2500SE can't hold two batteries at once, but you probably won't care: its 12-cell (versus the standard 8-cell) battery soldiers on for a little over 5 hours, twice as long as some other notebooks' batteries.

Gateway offers a couple of attractive configuration options for this all-in-one model: First, if you're an eraserhead

CD/DVD-ROM drive speed	56-kbps modem protocol	EXPANDABILITY: Maximum RAM (MB)	Modular expansion bays	Bay for second battery	Optional docking station	Infrared port	CUSTOMER SUPPORT: Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
10X-24X	not included	256	1	●	●	●	3/1	24	Sat, Sun	AOL, BBS, CIS, WWW
2X DVD-ROM	V.90	2BB	1	○	●	●	3/3	24	Sat, Sun	AOL, BBS, CIS, WWW
2X DVD-ROM	V.90	192	2	●	●	●	3/3	24	Sat, Sun	BBS, WWW
not included	V.90	12B	0	○	○	●	1/1	24	Sat, Sun	AOL, BBS, WWW
12X-24X	V.90	192	0	○	●	●	1/1	24	Sat, Sun	BBS, CIS, WWW
10X-24X	V.90	256	1	●	●	●	3/3	24	Sat, Sun	BBS, WWW
10X-20X	V.90	2BB	0	○	●	●	3/3	24	Sat, Sun	AOL, BBS, CIS, WWW
12X-24X	V.90	256	0	○	○	●	1/1	24	Sat, Sun	AOL, BBS, CIS
10X-24X	K56flex	96	0	○	○	●	3[2]/3	11	none	BBS, CIS, WWW
10X-24X	V.90	256	1	○	○	●	3[3]/1	11	none	WWW

[2] One year on screen and battery. [3] One year on screen.

pointer enthusiast, you can order one of them in place of the standard touchpad. And second, you can choose to ditch the unit's standard floppy drive in favor of a fixed SuperDisk LS-120 removable media drive ($75) and replace the 10X–20X CD-ROM drive with a DVD-ROM drive ($150). If you want to use the 2500SE as your primary PC, you can purchase a port replicator for $99 more.

Gateway Solo 2500SE's battery lasts for 5 hours.

Near Misses

Of the eight new notebooks we tested that missed our charts, the NEC Versa LX and Micron TransPort Trek II AGP came closest to making the grade.

FAST, SMART, and loaded with plenty of business features and multimedia gewgaws, the $3099 NEC Versa LX has a little something for everyone. For power users, the Pentium II-333 notebook approaches Pentium II-366 speed. Frequent travelers have a couple of attractive options: using two batteries at once to extend the already impressive battery life (the optional second pack costs $229), or using a placeholder module to pare the weight to 6.8 pounds. The modular bay also accommodates the bundled CD-ROM drive, an optional DVD-ROM drive ($150 extra), or a second hard drive of up to 10GB ($799), all swappable in suspend mode.

The LX's slim silver-and-charcoal case (less than 2 inches thick) has a big screen, great audio, and connections for recording sound from external equipment and for using a TV as a monitor or movie screen. NEC's relatively weak tech support—the primary reason this notebook doesn't make our charts—seems finally to be improving a bit, to judge from our recent anonymous calls.

MICRON'S DESKTOP DISPLACER

EQUIPPED WITH a Pentium II-366 CPU, the $3199 Micron TransPort Trek II AGP keeps pace with the fastest notebooks we've tested. At 9 pounds, however, this notebook weighs too much for traveling comfort. So we'd recommend using it mostly on your desk for office work, video and audio editing, and entertainment.

The $3199 Micron's separate audio-in and audio-out ports permit you to hook up multiple devices for recording and playing back sound. The machine's TV-out jack connects to a television's S-video port to deliver top-quality DVD-ROM movies.

A few caveats: The portable's sound, like that of most notebooks, is feeble. And the fan on the unit we tested was annoyingly loud, a problem Micron says it has fixed.

Unfortunately, the only extra option Micron currently offers for the notebook's modular bay is a second hard drive. And if you want a memory upgrade, you'll have to take the notebook in to a service center.

Our readers praise Micron's toll-free support; and in our own anonymous technical support calls, we've gotten through more easily lately than in the past. But the quality of advice still varies considerably.

—*Carla Thornton*

Contributing Editor Carla Thornton regularly writes about notebooks. ■

BEYOND THE TOP 10

We tested six other portables this month, but they did not score high enough to make the *Top 10 Notebook PCs* chart. For reviews, visit PC World Online (www.pcworld.com/top400)

- **Compaq Armada 1750**
- **Compaq Armada 3500**
- **Compaq Prosignia 140**
- **Enpower ENP-805**
- **Fujitsu LifeBook L440-B**
- **Twinhead Slimnote VX2**

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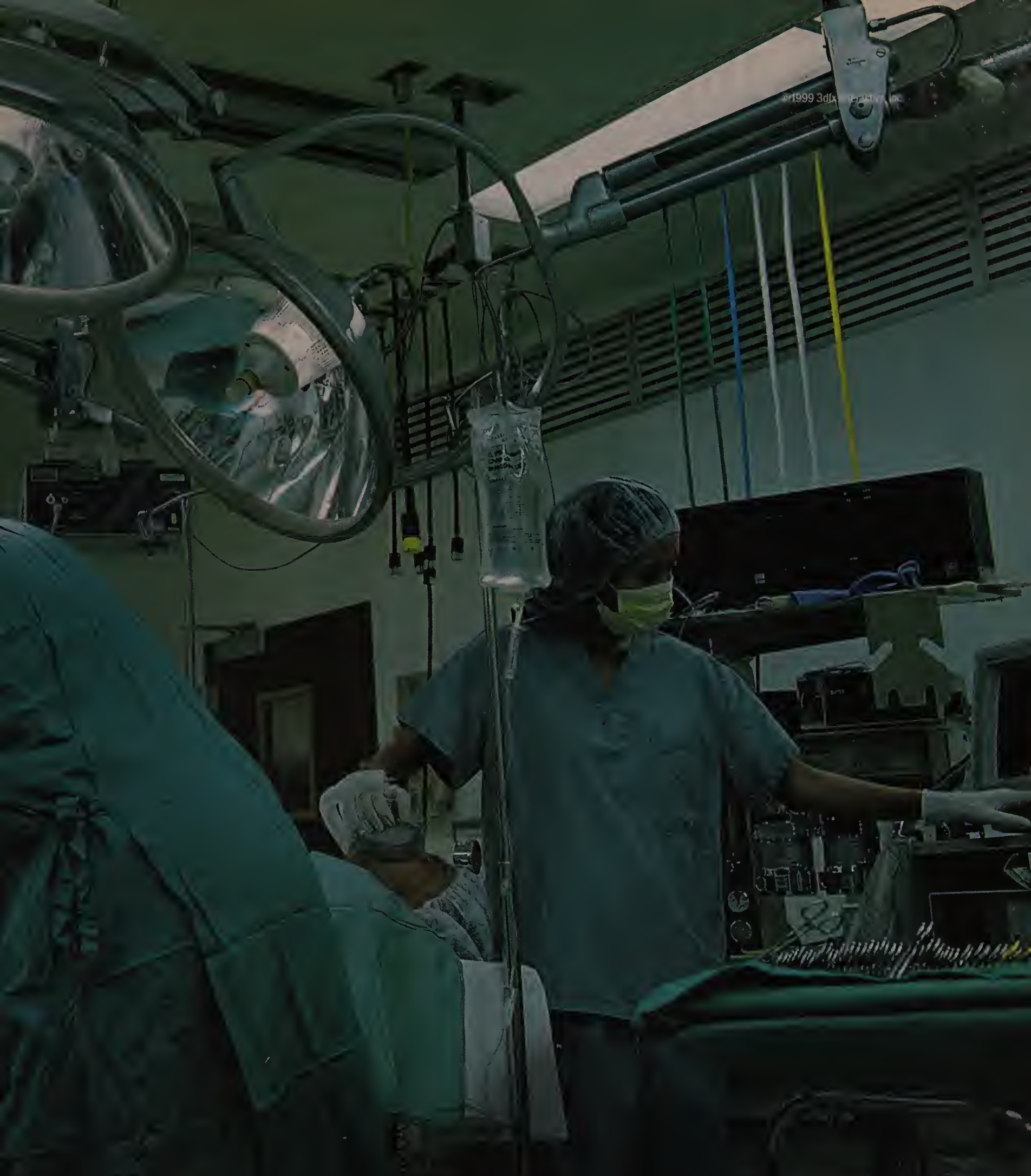

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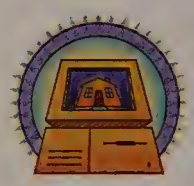
PC WORLD

TOP 10 HOME PCs

	POWER SYSTEM	Last month	Month tested	Street price (3/19/99)	Comments
1	Dell Dimension XPS T500 800/388-8542 www.dell.com	1	Apr 99	$2097	**PRO:** Fastest home PC to date, Zip drive, whopping $246 price drop, only vendor to earn outstanding support rating for its home systems. **CON:** Scanty software package.
2	Gateway Performance 500 800/315-2536 www.gateway.com	3	Apr 99	$2499	**PRO:** $140 price cut, superfast, terrific monitor quality, outstanding sound system. **CON:** Pedestrian software package.
3	Compaq Presario 5600i-500 800/345-1518 www.compaq.com	n/a	May 99	$2670	**PRO:** Speedy, built-in DSL and home networking capabilities, Zip drive, easy access to USB and FireWire ports. **CON:** Pricey.
4	Sony VAIO PCV-E518DS 888/476-6972 www.sony.com/pc	5	May 99	$3498	**PRO:** Hardware and software extras for digital imaging. **CON:** Very pricey, so-so sound quality from built-in speakers, poor upgradability.
5	IBM Aptiva S Series 651 888/426-7235 ext. 4340 www.pc.ibm.com	n/a	NEW	$3048	**PRO:** Terrific speed, tons of storage, hardware extras including multimedia keyboard and mouse with built-in track point. **CON:** Rather pricey, undistinguished support rating.
	BUDGET SYSTEM				
1	Dell Dimension V400c 800/388-8542 www.dell.com	2	May 99	$1300	**PRO:** Impressive performance, first-class support rating, huge $207 price cut. **CON:** Not super-expandable, skimpy software package.
2	Quantex QP6/333 M-1c 800/896-4898 www.quantex.com	1	Feb 99	$949	**PRO:** Rock-bottom price for an aging Celeron-333 PC, very good performance for the money, $50 price reduction. **CON:** Connectors not clearly labeled for setup.
3	Micron Millennia C433 888/546-0501 www.micronpc.com	n/a	NEW	$1526	**PRO:** Fastest budget system yet, excellent 3D performance for a budget PC, price includes subwoofer. **CON:** On the pricey side, spartan software package.
4	Gateway Essential 400c 800/315-2536 www.gateway.com	n/a	NEW	$1587	**PRO:** Great speed, great monitor quality, easily expandable, price includes an Epson Stylus Color 440 printer. **CON:** Most expensive budget system.
5	IBM Aptiva E Series 240 888/426-7235 ext. 4340 www.pc.ibm.com	n/a	NEW	$1198	**PRO:** Good price, faster than most other systems with the same CPU, microphone headset included at this price. **CON:** Limited expandability, mediocre support rating.

Best Buy n/a = not applicable

[1] For more about products here, select the number on the product information card or visit www.pcworld.com/productinfo.



IF SHAKESPEARE were writing about computers today, he might say that an Intel processor by any other name runs as sweet. And he'd be right—judging from the scores of this month's two highest-ranked budget systems. PCs equipped with the latest Celeron CPUs performed within a few percentage points of comparably configured Pentium II machines. And that's great news for your wallet.

Two of the seven new budget systems we tested this month run on Celeron CPUs. And both of them—the Gateway Essential 400c and the Micron Millennia C433 (the first 433-MHz Celeron home system we've tested)—cracked the budget side of the chart, as did IBM's brand-new Aptiva E Series 240, built around AMD's K6-2-350.

Who knows? Some day they may even catch up with our top budget machine—the Dell Dimension V400c, which took over the top spot thanks to a $207 price cut. Meanwhile, this month's power chart is similar to last month's. Still at number one is Dell's $2097 Dimension XPS T500. The only new power system we tested this month was IBM's Aptiva S Series 651—and it grabs the number five spot on our power chart.

Our tests indicate that the new Celeron systems are closing the gap on the Pentium II–based machines. Micron's Celeron-433–based Millennia C433 earned a PC WorldBench 98 score of 206, identical to that of Micron's latest Pentium II-400 system, the Millennia 400. And when you consider that the $1526 Millennia C433 costs $300 less than the Millennia 400, you have to ask yourself: To buy or not to buy a Pentium?

Gateway Essential 400c

PENTIUM VS. CELERON

THERE'S NO EASY ANSWER. If price is your main consideration, Celeron systems will always be cheaper, especially as PC makers roll out their newest PIII-500 and PIII-550 machines. If you're looking for speed, PII systems will nearly always have a slight performance edge over Celeron-based systems with the same clock speed, thanks to their 100-MHz bus. Still, Celeron systems offer tons of muscle for all but the most power-hungry users.

Debuting at number three, Micron's Millennia C433 with its 64MB of RAM posted a superfast PC WorldBench 98 score. Overall, the C433 finished a full 13 points ahead of the next fastest budget PC—the Gateway Essential 400c. But even though the Millennia C433 posted the same PC WorldBench 98 score as the Millennia 400, gaming and graphics nuts will be more impressed by the superior graphics scores of the Pentium II Micron system.

Despite the savings you can realize by buying a Celeron PC, Gateway takes a different turn with its Essential 400c. Rather

PHOTOGRAPHS: KEN SMITH

SCORECARD

★ Overall rating	PC WorldBench 98 score/rating	Price	Setup/ ease of use	Graphics	Reliability/ support	Features	Product info number[1]
103	231/outstanding	inexpensive	outstanding/ very good	outstanding	good/ outstanding	Pentium III-500, 128MB of SDRAM, 12GB hard drive, 4.8X DVD-ROM drive, V.90 56-kbps modem, 17-inch monitor, Turtle Beach Montego sound card.	–
99	229/outstanding	expensive	outstanding/ very good	outstanding	fair/ good	Pentium III-500, 64MB of RAM, 13.6GB hard drive, 4.8X DVD-ROM drive, V.90 56-kbps modem, 19-inch monitor, Boston Acoustics BA635 speakers.	632
94	226/outstanding	very expensive	outstanding/ very good	outstanding	fair/ fair	Pentium III-500, 128MB of SDRAM, 14.4GB hard drive, 2X DVD-ROM drive, V.90/DSL modem, 19-inch monitor, built-in ethernet, JBL speakers.	633
93	217/good	very expensive	outstanding/ good	outstanding	good/ good	Pentium III-500, 128MB of SDRAM, 17GB hard disk, Sony CD-R/RW drive, V.90 56-kbps modem, 17-inch monitor.	634
91	227/outstanding	very expensive	good/ good	fair	good/ fair	Pentium III-500, 128MB of SDRAM, 17.2GB hard disk, 4.8X DVD-ROM drive, V.90 56-kbps modem, 17-inch monitor, IBM Infinity speakers.	–
Power scorecard weightings ▶	Performance 20 percent	Price 10 percent	Setup/ease 5 percent	Graphics 10 percent	R & S 40 percent	Features 15 percent	
93	190/outstanding	moderate	outstanding/ outstanding	good	good/ outstanding	Celeron-400, 64MB of SDRAM, 8.4GB hard drive, 4.8X DVD-ROM drive, V.90 56-kbps modem, 17-inch monitor, Harman/Kardon HK195 speakers.	–
90	169/very good	very inexpensive	good/ good	good	good/ good	Celeron-333, 64MB of SDRAM, 4GB hard drive, 12X-32X CD-ROM drive, V.90 56-kbps modem, 15-inch monitor.	635
88	206/outstanding	expensive	good/ very good	very good	good/ good	Celeron-433, 64MB of SDRAM, 13GB hard drive, 4.8X DVD-ROM drive, V.90 56-kbps modem, 17-inch monitor, Advent AV009 speakers.	636
88	193/outstanding	expensive	outstanding/ very good	good	fair/ good	Celeron-400, 64MB of SDRAM, 10GB hard drive, 4.8X DVD-ROM drive, V.90 56-kbps modem, 17-inch monitor, Boston Acoustics BA635 speakers.	637
87	173/very good	inexpensive	very good/ good	good	good/ fair	AMD K6-2-350, 64MB of SDRAM, 6.4GB hard drive, 14X-32X CD-ROM drive, V.90 56-kbps modem, 15-inch monitor, IBM Infinity speakers.	–
Budget scorecard weightings ▶	Performance 15 percent	Price 25 percent	Setup/ease 10 percent	Graphics 5 percent	R & S 40 percent	Features 5 percent	All products: 902

than keep the price considerably lower, Gateway offers one great extra: Epson's Stylus Color 440 printer. The 400c also packs 64MB of RAM, a 10GB hard drive, and a 4.8X DVD-ROM drive. At $1587, that package is a terrific value.

The 400c's 17-inch EV700 monitor displays crisp text and great color graphics. The Essential 400c has an easy-off case and good expandability, as well as clear access to the interior's expansion slots and bays.

IBM Aptiva E Series 240

NEW FROM BIG BLUE

ALSO NEW THIS MONTH are IBM's two latest machines: the Aptiva E Series 240 and the Aptiva S Series 651. On the budget side, the $1198 E Series 240 is a basic system for users who don't need the latest, greatest technology. Its AMD K6-2-350 processor delivers PII-333–level performance with a PC WorldBench 98 score of 173, a few percentage points faster than most PCs using the same AMD CPU. Its integrated ATI 3D Rage Pro Turbo AGP chip with 8MB of RAM posted graphics scores that matched or bettered those of every other ranked budget system except the Micron Millennia C433.

Adding a 3.5-inch drive—such as a Zip drive—is simple, thanks to a clever case design that lets the small drive bay swing out for easy access. But adding a larger drive—such as a hard drive—is trickier. You'll need the manual dexterity of a magician to attach the cables. All the free externally accessible drive bays are covered by a plastic door on the front of the case that you must open to access any newly installed drive. This is a handy way to protect the drives; but if you're impatient, you'll be tempted to remove the door as soon as you've installed a new drive.

IBM's Aptiva S Series 651 is a speedy Pentium III–based power system that comes with 128MB of RAM and a gargantuan 17.2GB hard drive. And if that's not enough storage for you, Big Blue expects to be shipping the S Series 651 with a 24GB hard drive by the time you read this. At $3048, the 651 costs over $900 more than the similarly configured Dell Dimension XPS T500—though the T500 comes with a smaller 12GB hard drive.

The software bundles on the E Series 240 and S Series 651 include Lotus SmartSuite Millennium Edition, Quicken 98, and ViaVoice 98, IBM's speech recognition software. ViaVoice 98 comes with its own microphone headset, so you'll be ready to start making pretty speeches to your PC.

—*Kirk Steers*

Oakland, California, writer Kirk Steers is a contributing editor for PC World. ■

BEYOND THE TOP 10

We evaluated the following systems this month, too, but they did not score high enough to make the *Top 10 Home PCs* list. For write-ups, see PC World Online (www.pcworld.com/t10homepcs).

- **CyberMax Enthusiast KII-380**
- **Micron Millennia 400**
- **Packard Bell Multimedia 8300**

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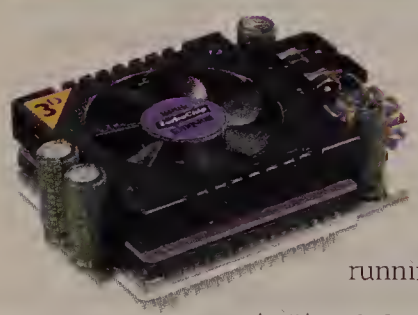

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PC WORLD

TOP 10 PRINTERS

	SMALL-BUSINESS/HOME COLOR	Street price (3/10/99)	Overall rating	Speed for plain text/full-page graphics (ppm)	Print quality for text/color graphics	Comments	Product info number
1	Epson Stylus Photo 700 800/463-7766 www.epson.com	$249	86	1.3/0.4	adequate/ good	**FEATURES:** Ink jet, speed unrated. 1440-by-720-dpi maximum resolution, 100 sheets input, 30 output. **SUMMARY:** Our new number one offers good graphics print quality on plain paper—and outstanding quality on specialty media—but text speed is particularly slow. Includes a strong photo-oriented software bundle.	–
2	Lexmark 3200 Color Jetprinter 800/539-6275 www.lexmark.com	$179	85	2.1/0.4	good/ good	**FEATURES:** Ink jet, rated 6 ppm monochrome/2.5 ppm color. 1200-by-1200-dpi maximum resolution, 100 sheets input, 25 output. **SUMMARY:** Solid print quality for a reasonable price, but performance is somewhat slow and the design could be sturdier. The number four 5700 Color Jetprinter offers more features but costs $70 more.	697
3	HP DeskJet 882C (NEW) 800/752-0900 www.hp.com	$299	84	4.3/0.8	good/ good	**FEATURES:** Ink jet, rated 5 ppm monochrome/2 ppm color. 600-by-600-dpi resolution (maximum resolution unrated), 100 sheets input, 50 output. **SUMMARY:** Impressive print quality on both text and graphics; fastest speeds on the SOHO chart, but somewhat steep price keeps it from the top spot.	698
4	Lexmark 5700 Color Jetprinter 800/539-6275 www.lexmark.com	$249	83	2.9/0.3	good/ good	**FEATURES:** Ink jet, rated 8 ppm monochrome/4 ppm color. 1200-by-1200-dpi maximum resolution, 100 sheets input, 25 output. **SUMMARY:** Faster on text than either Best Buy but a bit slower on graphics, this sturdy model delivers high-quality output across the board. More comprehensive features than the number two 3200 Color Jetprinter.	699
5	Canon BJC-4400 800/652-2666 www.ccsi.canon.com	$149	82	2.1/0.4	adequate/ adequate	**FEATURES:** Ink jet, rated 6.5 ppm monochrome/2.5 ppm color. 720-by-360-dpi maximum resolution, 100 sheets input and output. **SUMMARY:** A fine printer for the price. Good paper-handling capabilities help compensate for slow page-generation speeds and middling (but still adequate) print quality.	700
6	Epson Stylus Color 440 800/463-7766 www.epson.com	$129	81	2/0.6	good/ adequate	**FEATURES:** Ink jet, rated 4 ppm monochrome/2.5 ppm color. 720-by-720-dpi maximum resolution, 100 sheets input, 30 output. **SUMMARY:** The cheapest on the chart following a $20 price drop; prints text more slowly than most, but with good quality. Graphics output could be better.	–
7	Epson Stylus Color 1520 800/463-7766 www.epson.com	$499	80	3.3/1.2	good/ good	**FEATURES:** Ink jet, rated 6 ppm monochrome/5 ppm color. 1440-by-720-dpi maximum resolution, 100 sheets input, 35 output. **SUMMARY:** Good choice if you need wide-format printing—on sheets up to 13 by 19 inches. Decent print quality at default settings, and outstanding output at special settings on ink jet stock.	–
	CORPORATE COLOR						
1	Tektronix Phaser 740/N 800/835-6100 www.tek.com	$1850	89	8.9/0.5	good/ adequate	**FEATURES:** Laser, rated 16 ppm monochrome/5 ppm color. Standard 32MB of RAM, 1200-by-1200-dpi maximum monochrome/600-by-600-dpi maximum color resolutions, 350 sheets input, 500 output. **SUMMARY:** You can upgrade this quick, cheap laser to include even more features. Strong text quality, but graphics output can be inconsistent.	701
2	Tally T8104 800/843-1347 www.tally.com	$1799	88	9.8/0.5	good/ good	**FEATURES:** Laser, rated 16 ppm monochrome/8 ppm color. Standard 24MB of RAM, 1200-by-600-dpi maximum resolutions, 250 sheets input and output. **SUMMARY:** A big $630 price drop moves the Tally, now the cheapest corporate model, up to second place. Fastest text speed on the chart and good print quality also help.	702
3	Lexmark Optra SC 1275 800/539-6275 www.lexmark.com	$1899	88	7.5/0.5	good/ good	**FEATURES:** Laser, rated 12 ppm monochrome/3 ppm color. Standard 16MB of RAM, 600-by-600-dpi maximum resolutions, 400 sheets input, 250 output. **SUMMARY:** This great choice for busy offices now costs $250 less and still features strong print speeds, extensive paper-handling options, good all-around print quality, and an easy-to-use design.	703

Best Buy · Recommended for home · Windows 95-certified Plug and Play · All products: 908

TEST PC WORLD CENTER

HOW WE TEST The overall rating for both small-business/home and corporate printers is based on print quality (25 percent), price (25 percent), features (15 percent), speed (10 percent), service and support (10 percent), and ease of use (15 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

AFTER YEARS OF EXPERIENCE, ink jet manufacturers should be able to produce printers with near-perfect color quality. But two of the new models we reviewed this month indicate that's still not the case—no matter what you pay. At the low-price end, the $99 HP DeskJet 420C may be cheap, but with its crummy print quality, it's no deal. The high-end $449 Epson Stylus Color 900—one of the most expensive SOHO ink jets around—produces ▶

much poorer image quality than we expect for the price. Both printers miss the chart.

Prices aside, it was a busy month for us. Besides the HP and the Epson, we tested two other small-business/home color ink jets. HP's DeskJet 882C, a worthy successor to the recently retired 722C, arrives in third place on the chart. Meanwhile, Canon's BJC-6000, a printer with almost all the earmarks of a chart maker, falls short due to unimpressive print quality. For the corporate world, we tested a super-cheap color laser, Minolta's $1699 Color PageWorks L, but it prints too slowly to make the grade at any price.

BOGUS BARGAIN

HP'S DESKJET 420C costs only $99—but it's still no bargain. While most ink jet printers hold both a black and a color cartridge simultaneously, the 420C accommodates only one at a time. As a result, when the color cartridge is installed, color documents lack the black ink needed to produce accurate, vibrant colors. Instead, the 420C relies on overlaid magenta, yellow, and cyan to create a composite black that betrays a faint bluish tint. And with the black cartridge installed, the 420C does a lousy job on plain text. Strike three: It's excruciatingly slow. If you really must go the low-cost route, opt for the Epson Stylus Color 440, our number six unit, which offers much better print quality for a budget-friendly $129.

At the other end of the SOHO price spectrum, Epson's Stylus Color 900 rings up the register to the tune of $449. For that price we expect a lot of a printer. On speed, the 900 delivers: It prints text at 6.4 pages per minute, faster than any other ink jet we've tested recently, and text quality is reasonably good. Unfortunately, its gritty, flat gray-scale and color graphics lack detail. Other complaints: The paper trays are flimsy, and the driver is unduly complicated. On the bright side, when you register the 900, you can select two free pieces of serious business software from a list that includes Ventura Publisher and Lotus Freelance, and the printer is covered by an overnight exchange warranty.

MAINSTREAM INK JETS

HP DISCONTINUED production of its top-ranked DeskJet 722C late last year, and this month we tested its successor, the DeskJet 882C. Our verdict? The 882C is almost the same printer—not a bad thing. It delivers similar performance on text, at 4.3 ppm, and on graphics it's considerably faster than the 722C, at 0.8 ppm. The 882C's print quality impresses, too. Text looks attractive, while color and gray-scale graphics shine on plain paper and dazzle on coated ink jet stock. But the 882C's price tag also harkens back to the 722C era: At $299, it's more expensive than most current SOHO ink jets.

The other new ink jet we saw, Canon's BJC-6000, doesn't try to replace the just-retired BJC-5000—and a good thing it doesn't: The BJC-5000 was our top-ranked ink jet, while the BJC-6000 doesn't make the chart. (We'll test the 5000's replacement in August.) The BJC-6000 prints fast for a $249 model: At 4.6 ppm on text and 0.9 ppm on graphics, it's faster than anything on the SOHO chart. It prints black text cleanly, but quality breaks down on graphics—color images look washed out and lack detail, and gray scales are wretchedly coarse and gridlike. Finally, the 6000's driver is complex and has the only watermark tool we've seen that doesn't let you define your own watermarks.

HEWLETT-PACKARD'S DeskJet 882C prints high-quality text and graphics, but at $299 it's on the pricey side.

SLOWPOKE LASERS

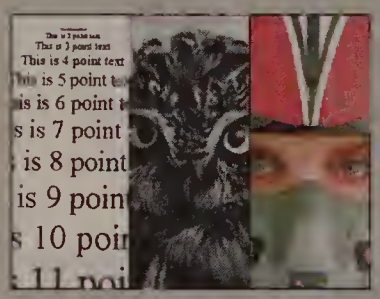
MINOLTA'S COLOR PAGEWORKS L bears some resemblance to QMS's Magicolor 2 DeskLaser (see April's *Top 10 Printers*, www.pcworld.com/apr99/t10printers). Both are stripped-down versions of excellent color laser printers, and both are unacceptably slow. On top of that the Minolta isn't nearly as cheap as the $1299 QMS: At $1699, it costs only $151 less than the top-ranked Tektronix Phaser 740/N.

Competition remains vicious in the color laser arena. Tally cut a huge $630 from the price of its T8104 (to $1799), moving the unit up to second place. Meanwhile, Lexmark trimmed $250 off its third-ranked Optra SC 1275—but even the new $1899 price couldn't keep it above the Tally.

—*Dan Littman* ■

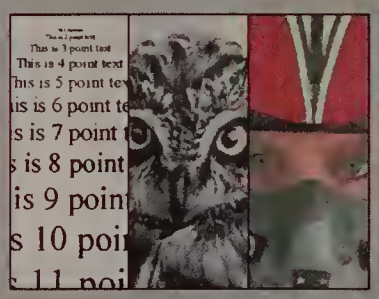
PRINT QUALITY SAMPLES

New HP Produces Pleasing Pics



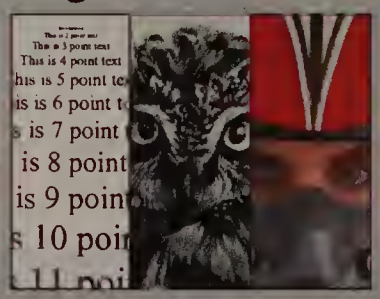
EPSON STYLUS PHOTO 700

Number one SOHO Best Buy performs better on images than on text, which came out a bit fuzzy on our tests. Colors are smooth and details sharp on ink jet paper.



HP DESKJET 882C

Third-place small-business printer produces smooth, richly detailed gray-scale and color images; text output is good but not first-rate due to slight shadowing.



TEKTRONIX PHASER 740/N

Our corporate Best Buy, the $1850 Tektronix Phaser 740/N delivers clear text and realistic gray-scale images. Color images look a bit dark, however.

*See owner's manual/limited warranty for recommendations on operation at low or no air pressure. Pressure-warning system required. Sold separately.
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PC Computing — Color PageWorks P5, 5/98

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PC WORLD

TOP 10 MONITORS

	17-INCH MONITOR	Month tested	Street price (3/15/99)	Overall rating	Quality of text/graphics	Comments	Product info number
1	ViewSonic PT775 800/888-8583 www.viewsonic.com	Oct 98	$439	90	very good/ excellent	**FEATURES:** 15.9-inch viewable area, .25mm stripe pitch Diamondtron tube, up to 117-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 16-hour toll-free support (excluding Sundays). **SUMMARY:** $30 price cut and extended support hours promote monitor to Best Buy. Displays sumptuous colors.	609
2	IBM P72 800/426-7255 ext. 4753 www.pc.ibm.com/options/ monitors	Oct 98	$529	89	excellent/ excellent	**FEATURES:** 15.7-inch viewable area, .25mm stripe pitch Trinitron tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 24-hour toll-free support. **SUMMARY:** Long-time Best Buy slips a notch. Contemporary style, gorgeous colors, and generous tech support justify the highest price here.	–
3	Samsung SyncMaster 700p Plus 800/933-4110 www.sosimple.com	Oct 98	$389	89	very good/ very good	**FEATURES:** 15.6-inch viewable area, .26mm dot pitch tube, up to 120-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 24-hour toll-free support. **SUMMARY:** Competitive price helps this handsome model maintain high ranking; bright colors and high refresh rate are also pluses. Controls have cryptic icons.	610
4	Optiquest V73 800/843-6784 www.optiquest.com	Apr 99	$339	87	very good/ excellent	**FEATURES:** 16-inch viewable area, .26mm dot pitch tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 11-hour weekday toll-free support. **SUMMARY:** Cheapest monitor here sheds $20. Displays rich colors, but controls require tedious button pressing and support hours are short.	611
5	Iiyama VisionMaster Pro 400 800/394-4335 www.iiyama.com	Oct 98	$439	87	very good/ very good	**FEATURES:** 15.7-inch viewable area, .25mm stripe pitch Diamondtron tube, up to 115-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 12-hour weekday toll-free support. **SUMMARY:** Fine image quality, color-correction utilities, and $30 price drop override ho-hum design, nonintuitive on-screen controls.	612
6	Sony CPD-220GS 800/352-7669 www.sony.com/displays	NEW	$449	86	very good/ excellent	**FEATURES:** 15.6-inch viewable area, .25mm stripe pitch Trinitron tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 24-hour toll-free support. **SUMMARY:** Bold colors and sharp text compensate for above-average price. Clearly presented controls are easy to learn and navigate.	613
7	AcerView 79g 800/379-2237 ext. 125 www.acerperipherals.com	Oct 98	$429	86	very good/ excellent	**FEATURES:** 15.9-inch viewable area, .25mm stripe pitch Diamondtron tube, up to 110-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 24-hour toll-free support. **SUMMARY:** Retested model has slightly larger viewable area. Displays lush colors, but icons for on-screen controls are crude.	614
8	LG 790SC 800/243-0000 www.lgeus.com	NEW	$360	85	good/ very good	**FEATURES:** 15.8-inch viewable area, .26mm dot pitch tube, up to 124-Hz refresh rate,[1] Plug and Play ready,[2] TCO'92 compliant, three-year warranty, 24-hour toll-free support. **SUMMARY:** Unusual case design, crisp colors, and low price earn it a spot on the chart. Text quality is adequate, but weaker than other contenders'.	615
9	NEC MultiSync E750 800/632-4636 www.nectech.com	Apr 99	$499	84	very good/ very good	**FEATURES:** 15.9-inch viewable area, .25mm dot pitch CromaClear tube, up to 114-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 11.5-hour weekday toll-free support. **SUMMARY:** $50 price cut helps it overtake the Dell. Easy on-screen controls and space-saving design, but still a bit pricey.	616
10	Dell UltraScan 1000HS 800/388-8542 www.dell.com	Oct 98	$374	83	very good/ excellent	**FEATURES:** 15.7-inch viewable area, .25mm stripe pitch Trinitron tube, up to 105-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, one-year warranty, 24-hour toll-free support. **SUMMARY:** Falls three notches, but still a good bargain. Short warranty extends to three years if monitor is purchased with a Dell system.	–

Best Buy For reviews of products that didn't make the chart, visit www.pcworld.com/t10monitors. All products: 901

TEST PC WORLD CENTER **HOW WE TEST** Ten judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, a newsletter, spreadsheets, Web pages, and scanned images. The overall rating is based on text and graphics quality (25 percent each), features and ease of use (25 percent), price (20 percent), and service and support (5 percent). The best possible overall rating is 100. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

[1] Highest refresh rate at 1024 by 768 resolution. [2] Plug and Play monitors and graphics cards can communicate bidirectionally. However, Windows 95 does not fully utilize monitor Plug and Play.

TWO NEW MONITORS snap up Top 10 spots. Sony's CPD-220GS claims sixth place with its fine graphics and well-laid-out on-screen controls. LG's 790SC debuts at number eight, thanks to vivid colors and a $360 price—the second lowest here. Meanwhile, ViewSonic's PT775 grabs first place on the strength of incremental price drops. At $439, it's a bargain for demanding graphics professionals. Next month we evaluate 15-inch monitors. ■

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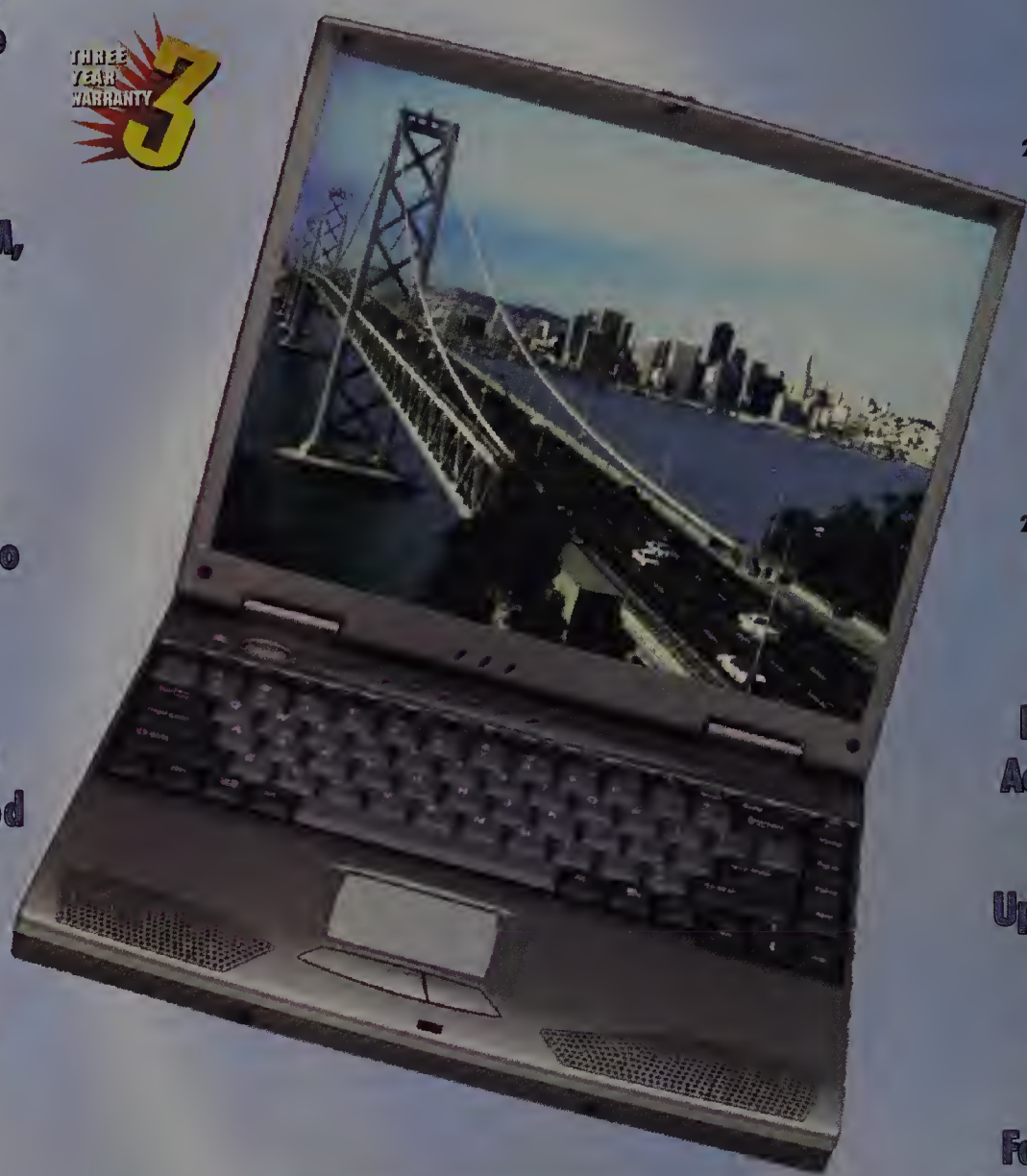

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PC WORLD

TOP 10 GRAPHICS BOARDS

	PCI BOARD	Month tested	Street price (4/1/99)	Overall rating	Mixed-media business rating	3D rating	Features rating	Comments	Product info number
1	Creative Labs 3D Blaster Banshee 800/998-1000 www.soundblaster.com	Mar 99	$100	93	good	excellent	good	FEATURES: 16MB of SDRAM, 250-MHz RAMDAC, 3dfx Voodoo Banshee chip, no bundled applications. SUMMARY: Fast in 3D games, delivering high frame rates, and it comes with a utility for color-calibrating your PC, monitor, and printer.	687
2	Matrox Millennium G200 SD PCI 800/361-1408 www.matrox.com/mga	Feb 99	$119	86	good	good	good	FEATURES: BMB of SGRAM, 250-MHz RAMDAC, MGA-G200 chip, bundled 3D modeling tool, image editing application, and 3D game. SUMMARY: A good buy thanks to a $10 price cut and such extras as 3D modeling and photo editing tools.	688
3	Elsa Erazor II 800/272-3572 www.elsa.com	NEW	$110	86	good	good	good	FEATURES: 16MB of SGRAM, 250-MHz RAMDAC, NVidia RIVA TNT chip, no bundled software. SUMMARY: This new board performs well in 3D tasks and comes with toll-free support, but it lacks bundled games and applications.	689
4	Creative Labs Graphics Blaster RIVA TNT 800/998-1000 www.soundblaster.com	Apr 99	$100	85	good	average	good	FEATURES: 16MB of SDRAM, 250-MHz RAMDAC, NVidia RIVA TNT chip, no bundled applications. SUMMARY: Debuts on chart thanks to a $30 price drop, solid performance, and a useful color calibration tool. However, it's slow in 3D.	690
5	Metabyte Wicked3D Vengeance 510/494-9700 www.wicked3d.com	Feb 99	$99	84	good	excellent	average	FEATURES: 16MB of SGRAM, 250-MHz RAMDAC, 3dfx Voodoo Banshee chip, bundled 3D game. SUMMARY: This card features a low price and terrific speed in 3D gaming, but bundled software and support policies are on the thin side.	691
	AGP BOARD								
1	Creative Labs Graphics Blaster RIVA TNT 800/998-1000 www.soundblaster.com	Feb 99	$100	92	good	excellent	good	FEATURES: 16MB of SDRAM, 250-MHz RAMDAC, NVidia RIVA TNT chip, no bundled software. SUMMARY: Good 3D quality, speed, and a $30 price cut make it a nice option for business and home users. Includes top-notch color-calibration utility.	692
2	Matrox Millennium G200 800/361-1408 www.matrox.com/mga	Oct 98	$129	91	excellent	good	excellent	FEATURES: BMB of SGRAM, 250-MHz RAMDAC, MGA-G200 chip, bundled 3D modeling tool and image editing application. SUMMARY: Strong performance in PowerPoint and AVI video playback makes it a good choice for business users.	693
3	Hercules Terminator Beast Supercharged 800/532-0600 www.hercules.com	NEW	$89	91	good	excellent	good	FEATURES: BMB of SDRAM, 250-MHz RAMDAC, S3 Savage3D chip, no bundled software. SUMMARY: The least expensive board on the chart provides good performance and lustrous 3D images, but is backed by skimpy support policies.	694
4	Elsa Erazor II 800/272-3572 www.elsa.com	Mar 99	$99	88	good	good	good	FEATURES: BMB of SGRAM, 250-MHz RAMDAC, NVidia RIVA TNT chip, no bundled software. SUMMARY: BMB version costs $30 less than—and runs as well as—its 16MB sibling, putting it on our list for the first time. But it lacks extras like bundled games.	695
5	ATI Rage Fury 905/882-2600 www.atitech.com	NEW	$169	88	good	good	excellent	FEATURES: 32MB of SDRAM, 250-MHz RAMDAC, ATI Rage 128 chip, bundled 3D games. SUMMARY: Fast performer lets you view games on TV, but 3D images look drab, and buggy drivers kept it from running our PowerPoint and Caligari tests.	696

Best Buy For reviews of products that didn't make the chart, visit www.pcworld.com/t10graphics. All products: 907

TEST PC WORLD CENTER **HOW WE TEST** We test boards under Windows 95. Business tests include PC WorldBench 98, a PowerPoint test, and a Macromedia Director script. Our 3D score is based on four games, each evaluated on frame rate and image quality. For AGP cards we add a texturing test using Caligari's TrueSpace3. We tested PCI boards in a Micron Millennia Mme PC with a Pentium MMX-233 and 32MB of RAM. We tested AGP boards in an NEC Direction 333 with a PII-333 and 64MB of RAM. Overall rating is based on performance (PCI 50 percent, AGP 55 percent), features (25 percent), price (PCI 15 percent, AGP 10 percent), and support policies (10 percent). For all scores, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

CREATIVE LABS DOMINATES the top spots this month with its fast 3D Blaster Banshee PCI and Graphics Blaster RIVA TNT AGP boards. Meanwhile, swift 3D performance casts ATI's pricey Rage Fury and Hercules' enhanced Terminator Beast onto our AGP list. But the ATI card we tested came with buggy drivers, so it couldn't run some of our graphics tests. Elsa's pleasing, middle-of-the-road Erazor II PCI board also debuts this month. ■

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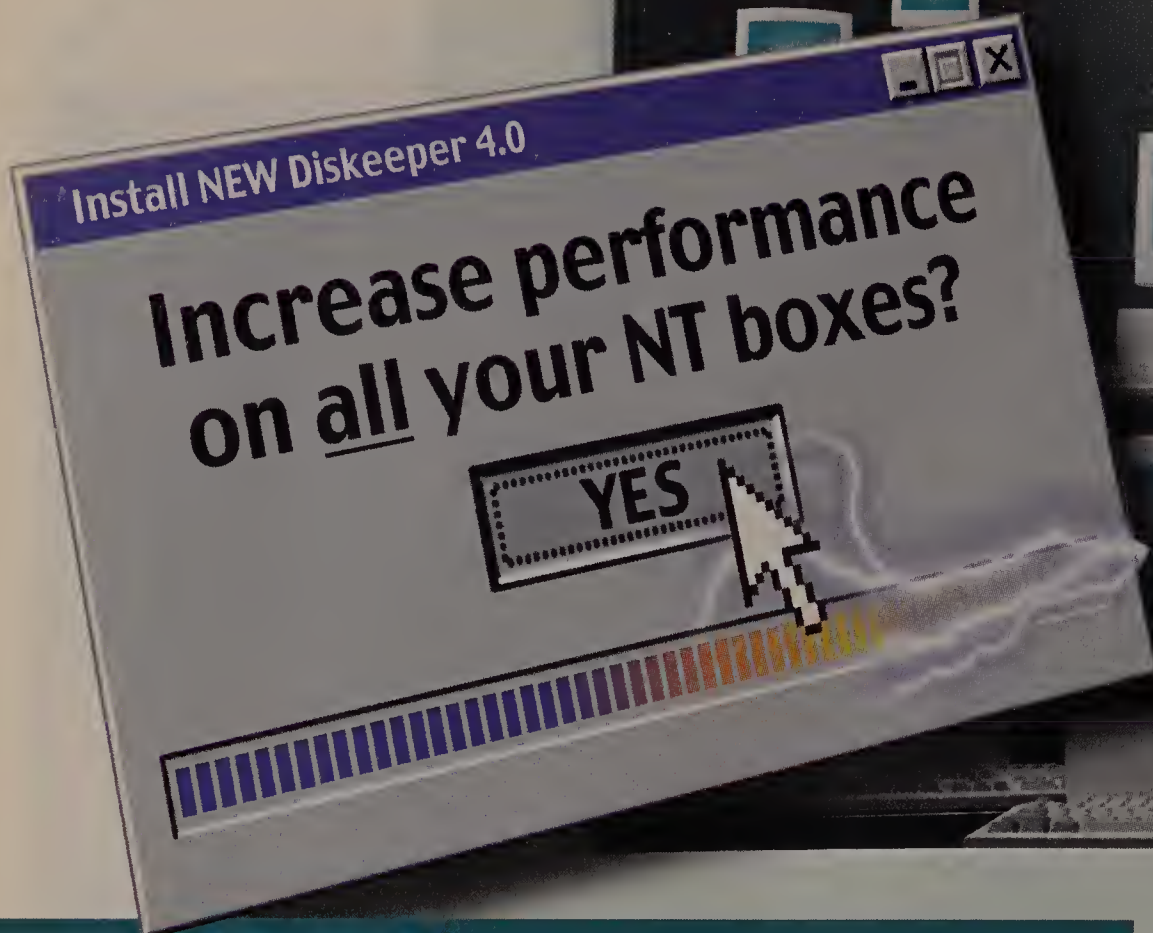
TOP 10 MODEMS

	INTERNAL V.90 MODEM	Month tested	Street price (3/31/99)	Overall rating	56-kbps downloads/ 33.6-kbps transfers (min:sec per MB)	Comments (all modems listed support V.90)	Product info number
1	MaxTech XPV56P NetPacer 56Kbps Internal Voice Modem 800/936-7629 www.maxtech.com	NEW	$38	80	4:04/6:01	**FEATURES:** Supports K56Flex, PCI card, Lucent chip set, V.80 videoconferencing, voice mail, speakerphone, Caller ID, SuperVoice software. **SUMMARY:** Feature-packed new modem offers adequate performance and a five-year warranty at a stunningly low price. The bundled SuperVoice software could stand some improvement.	704
2	Zoom/FaxModem 56K PCI Dualmode 800/631-3116 www.zoomtel.com	Jan 99	$75	79	4:16/5:40	**FEATURES:** Supports K56flex, PCI card, Rockwell chip set, MNP-10EC error control, V.80 videoconferencing, distinctive ring, voice mail, Communicate software. **SUMMARY:** Good choice for SOHO users on a strict budget has voice features and comes backed by long support hours. But its 56-kbps downloads are slowest here.	705
3	Diamond Multimedia SupraExpress 56i Sp 800/468-5846 www.diamondmm.com	Jan 99	$80	78	3:41/5:41	**FEATURES:** Supports K56flex, 16-bit ISA card, Rockwell chip set, V.80 videoconferencing support, distinctive ring, voice mail, speakerphone, Caller ID, FaxTalk Communicator software. **SUMMARY:** Excellent candidate for home offices performs well and has lots of features. Support reps are available 14 hours daily except Sunday.	706
4	Amquest Host PCI 56K Dual Mode Voice/Speakerphone 877/663-3648 www.amquestmodem.com	Feb 99	$49	78	3:35/5:39	**FEATURES:** Supports K56flex, PCI card, Rockwell chip set, MNP-10EC, V.80 videoconferencing support, voice mail, speakerphone, VoiceView, ASVD, DSVD, Caller ID, Amquest @fax.com software. **SUMMARY:** Second-cheapest modem on chart performs well and is packed with voice features, but we found it a bit hard to install.	707
5	Digicom Systems Modem Blaster Flash 56 PCI 800/833-8900 www.diglcomsys.com	Apr 99	$50	77	3:54/5:39	**FEATURES:** Supports K56flex, PCI card, Rockwell chip set, V.80 videoconferencing, MNP-10, distinctive ring, voice mail, speakerphone, ASVD, Caller ID, QuickLink Message Center III software. **SUMMARY:** Cheap full-featured modem is backed by daily 14-hour support. Thorny installation and middling manuals hold it back.	708
6	Viking V.90 56K ISA Modem 800/338-2361 www.vikingcomponents.com	Feb 99	$90	76	3:23/5:41	**FEATURES:** Supports K56flex, 16-bit ISA card, Rockwell chip set, voice mail, speakerphone, QuickLink III software. **SUMMARY:** Its 56-kbps performance is the best on the internal chart, and Viking provides around-the-clock technical support, but the manual is skimpy. A model without a speakerphone costs $60.	709
7	3Com U.S. Robotics 56K Faxmodem 800/342-5877 www.3com.com	Jan 99	$120	76	3:42/5:51	**FEATURES:** Supports x2, 16-bit ISA card, USR/T1 chip set, distinctive ring, Caller ID, RapidComm software. **SUMMARY:** The U.S. Robotics 56K Faxmodem offers peppy 56-kbps downloads and excellent documentation, but you pay a premium for them. 3Com's support and warranty are second to none.	710
	EXTERNAL V.90 MODEM						
1	Diamond Multimedia SupraExpress 56e 800/468-5846 www.diamondmm.com	Feb 99	$100	80	3:23/5:40	**FEATURES:** Supports K56flex, Rockwell chip set, V.80 videoconferencing, distinctive ring, voice mail, Caller ID, permanently attached serial cable, FaxTalk Communicator software. **SUMMARY:** Fastest external unit on chart for downloads is affordable, easy to install, small and portable, and backed by long support hours.	711
2	NewCom V.90 56K External Data/Fax Modem 800/563-9266 www.newcominc.com	Apr 99	$76	77	4:09/5:39	**FEATURES:** Supports K56flex, Rockwell chip set, voice mail, speakerphone, Caller ID, serial cable, Trio Communications software. **SUMMARY:** Inexpensive, but it takes 25 to 45 seconds per M8 longer on 56-kbps downloads than other modems on the chart, and the sparse manuals could confound some users.	712
3	Digicom Systems Modem Blaster Flash 56 II External 800/833-8900 www.digicomsys.com	Apr 99	$90	76	3:44/5:40	**FEATURES:** Supports K56flex, Rockwell chip set, V.80 videoconferencing, MNP-10, serial cable, distinctive ring, voice mail, speakerphone, ASVD, Caller ID, QuickLink Message Center III software. **SUMMARY:** Affordable, feature-rich; 56-kbps download performance is adequate; documentation could be better.	713

Best Buy online For reviews of products that didn't make the chart, visit www.pcworld.com/t10modems. All products: 909

TEST PC WORLD CENTER **HOW WE TEST** We test V.90 (56-kbps) and V.34 (33.6-kbps) performance over a Telecomm Analysis Systems simulated phone network. We connect each modem to two common Internet service provider modems—Ascend's Max 6000 and 3Com's Total Control. Using each ISP modem, we perform two tests. In the Network Model Coverage test, we send a .zip file over several different line conditions. In the File Type test, we send a mix of four files—graphics, text, program, and compressed—over one line condition. We average the results for the two ISP modems to calculate NMC and FT scores, which make up, respectively, 60 and 40 percent of the total performance score. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

EXTERNAL MODEM prices remain virtually unchanged this month, but a host of new super-inexpensive internal modems have appeared on the scene. MaxTech's new $38 XPV56P NetPacer 56Kbps Internal Voice Modem skips to the top of the chart, due mainly to its ultralow price. The NetPacer is among the slowest 56-kbps units we've tested, but it retails for only a third to a half of the cost of other internal modems. ■



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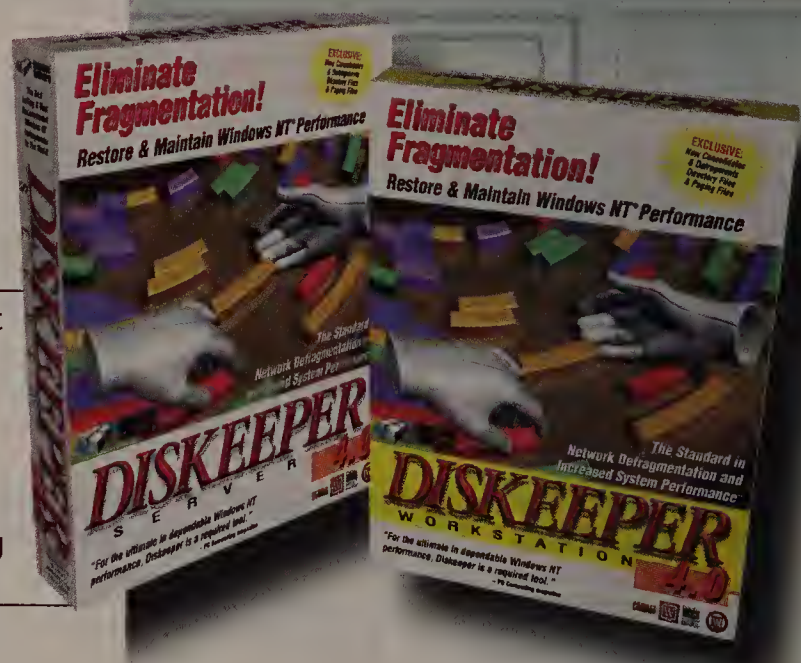

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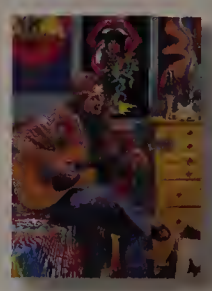

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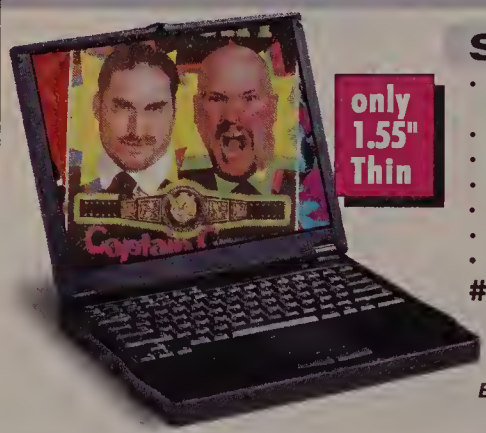

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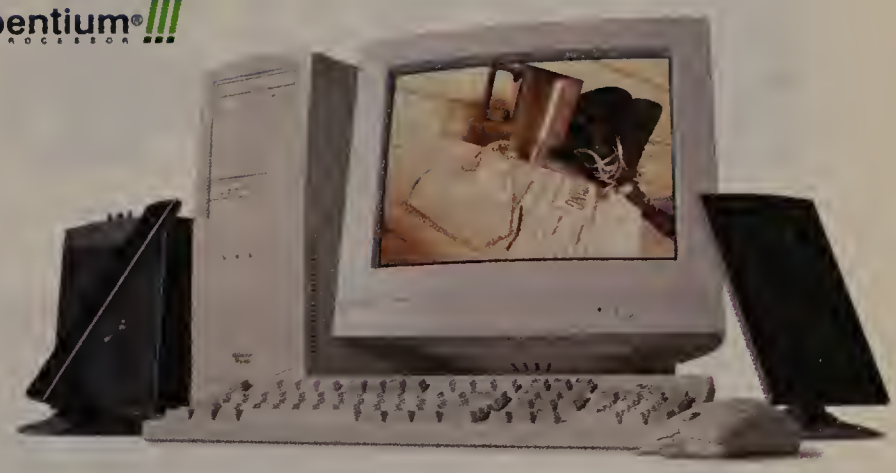

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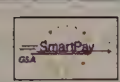

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HERE'S HOW

WINDOWS TIPS SCOTT DUNN

Troubleshoot and Repair Your Registry

EVERY TIME YOU BOOT UP your PC, you wait while it runs through its series of hardware self-checks and then initializes the software. Much of this process is visible on the screen. But deep in the background, your hardware and software consult the Windows Registry, the central repository of your PC's system settings and configurations. No on-screen messages alert you to that activity.

The process reveals itself only when serious problems arise, as when a device isn't recognized or Windows won't start. When you have device headaches, you can install a new driver or run the Add New Hardware applet in Control Panel. But if your system refuses to load the operating system, all you know is that Windows can't access the Registry or has insufficient memory to load it (see **FIGURE 1**).

The message may include an option to restore the Registry from Windows' automatic backup (user.dao and system.dao in the Windows folder in Win 95, or certain .cab files in the Windows\Sysbckup folder in Win 98); but if those files are corrupted as well, you're in deep trouble. If this evil fate befalls you, here are some tips and repair plans for rescuing (or at least salvaging) the Registry using the good old DOS prompt. Even if you don't have a Registry problem right now, save this article—one day you'll thank me.

If you're using Windows 98, chances are Windows either will send you to the DOS prompt when you boot, or will display the boot menu so you can arrange to go there yourself. In Windows 95, you'll need to restart your system. When you see the 'Starting Windows 95' message, press **<F8>** to display the Windows 95 Startup Menu; then press **7** and **<Enter>** to choose *Safe Mode Command Prompt*.

At this point, I recommend backing up your Registry files (corrupted or not) to ensure that your tinkering doesn't make matters any worse: Go to your Windows directory (for example, type **cd\windows** and press **<Enter>** if that's the folder where Windows is installed). Since the Registry files are hidden, type **attrib -s -h -r *.da*** and press **<Enter>**. Then use the *Copy* command to copy the following Registry files to another folder: system.dat, system.dao, user.dat, and user.dao. (Windows 98 users won't see the files ending in dao.)

Be careful not to overwrite any previous backups in the process. For example, if you want your backups stored in the c:\temp folder (and you don't have any other Registry backups there), type **copy system.da* c:\temp** and press **<Enter>**; then type **copy user.da* c:\temp** and press **<Enter>**. You can always restore these files to the Windows folder if something goes awry. Do this no matter which of the following techniques you subsequently adopt.

Plan 1: Now you're ready to start your repair work. If you're using Windows 98, you have a tool at your disposal to simplify the chore. At the DOS prompt, type **scanreg** and press

ILLUSTRATION: PHIL ANDERSON

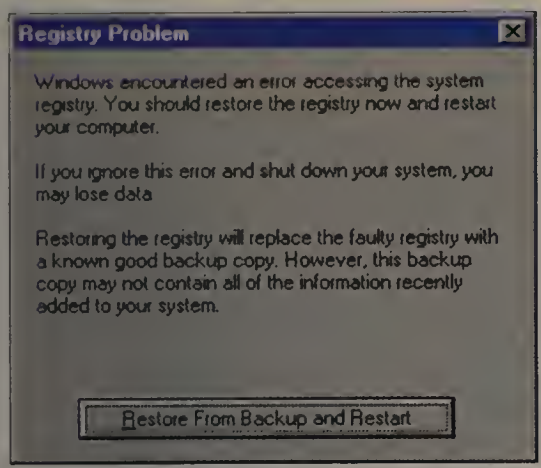

FIGURE 1: A CORRUPTED Registry isn't the end of the world if you have a Registry backup.

<Enter>. (Windows may already have told you to do this when you rebooted and found yourself at the boot menu.) ScanReg starts with a screen noting its function and containing two DOS-like buttons, Start and Cancel. Start is highlighted by default; press **<Enter>** to start the process.

ScanReg restores the Registry from the last good backup—that is, the last copy of the Registry that Windows successfully started up with—and lets you restart your computer. When prompted, press **<Enter>** to restart your computer.

98 **Plan 2:** If that doesn't do the trick, or if you're concerned that your latest backup may also be corrupted, return to the DOS prompt and type **scanreg /restore**. This causes ScanReg to display a list of backup files, together with the date of each. Select the copy you prefer, and then, with Restore highlighted, press **<Enter>** to restore it.

98 **Plan 3:** On the other hand, if you just installed some software and suspect its settings might not be in the backup—or if you have no backup files—start ScanReg by typing **scanreg /fix** at the DOS prompt and pressing **<Enter>**. If you're lucky, ScanReg will be able to repair the Registry. If not, keep reading.

9X **Plan 4:** If you're using Windows 95—or if ScanReg doesn't do the trick in Windows 98—it's time to get out that floppy and try restoring the Registry from a backup you made before the problems began. When you get to the DOS prompt, rename the system.dat (Win 95 and 98) and system.dao (Win 95 only) files by entering the command **ren system.dat system.dat.bak** followed by **ren system.da0 system.da0.bak**. Then copy these files to the Windows folder. If your backup files are in c:\backup, for example, type **copy c:\backup\system.dat c:\windows** (your actual path may differ) and press **<Enter>**. Restart your computer. If that doesn't work, do the same for the user backup files, user.dat and user.dao. Windows settings that have been changed—or programs that have been installed—after you made the backup may not work properly, and you may have to reinstall them.

9X **Plan 5:** Still in trouble? The DOS version of the Registry Editor, regedit.exe, may be able to save your bacon, whether you're operating under Windows 95 or Windows 98. You can solve some Registry problems by exporting the Registry to a text file and then importing it back again.

To export the user.dat portion to text, type a line similar to the following at the DOS prompt: **regedit /l:c:\windows\user.dat /e c:\user.txt** (your paths and export file name may differ). Press **<Enter>**. The /e switch indicates export, and the /l switch specifies the particular portion of the Registry that you're working with (more on this point later). Now rename the existing user.dat file by typing **ren user.dat user.bak** and pressing **<Enter>**.

Finally, to re-create the user.dat file based on the text file you exported, type **regedit /l:c:\windows\user.dat /c c:\user.txt** (your paths and export file name may differ) and press **<Enter>**.

As I'll explain later, Windows 98 users (but no one else) should substitute **/r** for /l in this command line. In either version of Windows, you'll need to include the /c switch to re-create the Registry from the text file. Now restart Windows and hope that everything is cool.

If the error persists, try the same thing with the system.dat portion of the Registry. Reboot to the Safe Mode Command Prompt, as before. At the DOS prompt, type **regedit /l:c:\windows\system.dat /e c:\system.txt** (your paths and export file name may differ) and press **<Enter>**. Now rename the existing system.dat by typing **ren system.dat system.bak** and pressing **<Enter>**. Finally, to re-create the system.dat file based on the text file you exported, type **regedit /l:c:\windows\system.dat /c c:\system.txt** (again, your paths and export file name may differ) and press **<Enter>**.

9X **Plan 6:** Extremely experienced users—and knowledgeable users who are sure about what's wrong with the Registry—may be able to edit the Registry itself from the DOS prompt. For example, if your system problems arose immediately after you made some Registry change in Windows, you can export the entire Registry to a single file (not just one part at a time, as described above) by typing **regedit /e registry.txt** (any file name will do) and pressing **<Enter>**. Then you can use Edit.com to open the text file you created (type **edit registry.txt** and press **<Enter>**) and make the necessary changes. When you have finished editing this text file, save the file and exit Edit.com.

If you don't need to re-create your ▶

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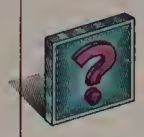
Registry files but merely want to merge the changed information, you can skip the /c switch and simply type **regedit registry.txt** and press **<Enter>**. Then restart the computer and cross your fingers. If this technique creates a text file that's too big for Edit.com, try the previously discussed techniques to establish a separate text file for each portion (user and system) of the Registry; edit the text file(s) and import each as described above.

These tricks are anything but foolproof. Large Registry entries can stymie the DOS version of the Registry Editor that comes with Windows 95. If that happens, you'll see an error message like 'Unable to open registry (14)' when you try to import or export your Registry file. Another complication: If you type **regedit /?** at the DOS prompt, the help listing will tell you to use the /l switch for system.dat and the /r switch for user.dat in all cases. In my experience, however, you must use the /l switch (with the /e switch—as discussed in Plan 5) when exporting any Registry file if you want to produce a properly exported file. Using the /l switch (together with/c) is also the best choice for re-creating the user.dat file in Windows 95.

In Windows 98, on the other hand, you must use the /r switch (with the /c switch) to re-create the user.dat portion of the Registry. But doing this has its own difficulties: Whether you use Windows 95 or 98, re-creating the user.dat with a command line like **regedit /r:c:\windows\user.dat /c c:\user.txt** restores user.dat but—catch-22—corrupts system.dat! Consequently, if you find that you have to restore the Registry this way in Windows 98, you should first export user.dat and system.dat; then restore user.dat; and finally restore system.dat to correct any corruption that occurs during the rehabilitation process.

Plan 7: If these or other problems foil your efforts to use regedit, you still have recourse to other, less desirable options. One technique is to restore system.dat by using system.1st, a backup that Windows creates during installation. At the DOS prompt, go to the root directory (type **cd** and press **<Enter>**). Type **attrib -s -h -r system.1st** and press **<Enter>**. Then copy this file back to the Windows directory as system.dat, by typing **copy system.1st c:\windows\system.dat** (remember, your path may differ). Next, restart Windows. In this case, as with other backups, you may have to reinstall software and redo changes that were made after this backup was created.

TAMING TASK SCHEDULER



BY MISTAKE, I turned on Task Scheduler in My Computer, and now I can't turn it off. I've deleted scheduled tasks, examined my StartUp folder, and made other efforts. Yet whenever I restart or boot the computer, Task Scheduler reappears in my system tray. How do I permanently turn off Task Scheduler?

Michael Tate, San Antonio

CHANCES ARE that you installed Microsoft Windows Critical Update Notification from the Microsoft Windows Update Web site. This notification software can cause Task Scheduler to keep running, since Critical Update Notification takes precedence over other Task Scheduler settings.

Unfortunately, if you have this software installed and you want to turn off Task Scheduler for good, you'll have to remove the Critical Update Notification software: First, choose *Start•Settings•Control Panel*, and double-click the *Add/Remove Programs* option. After you make sure the Install/Uninstall tab is in front, select *Windows Critical Update* and click *Add/Remove*. Then follow the on-screen instructions.

Next, in the system tray, double-click the *Task Scheduler* icon. When the Scheduled Tasks window opens, find *Critical Windows Update* on the task list, right-click it, and choose *Delete*. Then choose *Advanced•Stop Using Task Scheduler* (see **FIGURE 2**). Exit the Scheduled Tasks window.

If you later decide that you want to use Task Scheduler again, you can restart it by following these steps: Choose *Start•Programs•Accessories•System Tools•Scheduled Tasks;* then select *Advanced•Start Using Task Scheduler.*

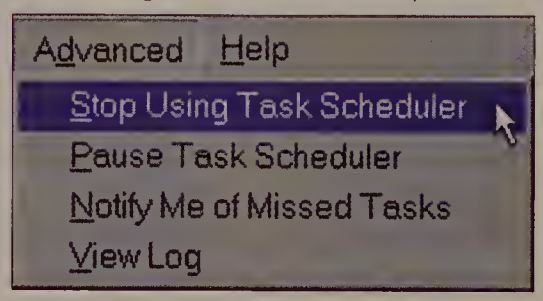
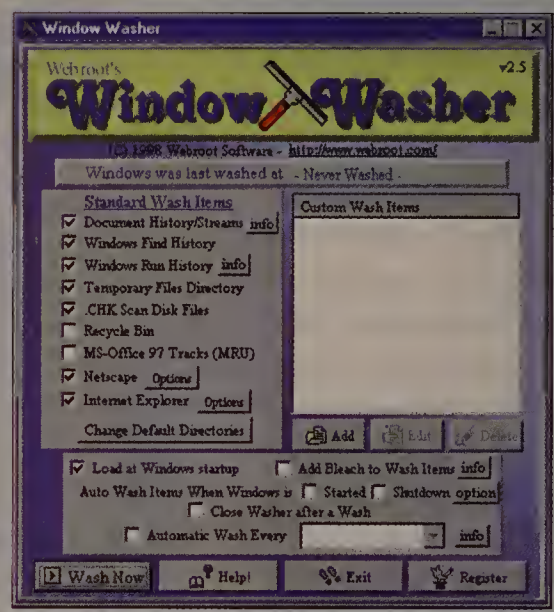


FIGURE 2: TO TRULY turn off Task Scheduler, you may have to remove certain software.

WINDOWS TOOLBOX

Window Washer Keeps Your System Clean and Private

WINDOWS DISK CLEANUP is a great step forward, but it only works in Windows 98, and some would say it doesn't go far enough. If you're willing to shell out $30, get Window Washer, a shareware utility from Webroot Software (www.webroot.com) that simplifies and automates the deletion of temporary, Recycle Bin, and other files, and removes your footprints from such diverse places as the Documents menu, Run history, recently opened files from your Office menus, browser history records, and cookies. If that's still not good enough, consider using the Custom Washed Items feature to add your own items to the laundry. You can even add bleach to the wash—that is, "shred" deleted items so they can't be unerased. Window Washer works with Netscape, Internet Explorer, and America Online. A 30-day trial version is available on FileWorld.



Download files mentioned in this article from www.fileworld.com/magazine. We welcome your questions and tips and pay $50 for published items. Scott Dunn is a contributing editor for PC World *and a principal author of* The PC Bible, 2nd Edition *(Peachpit Press, 1995). See page 14 for contact information.* ■

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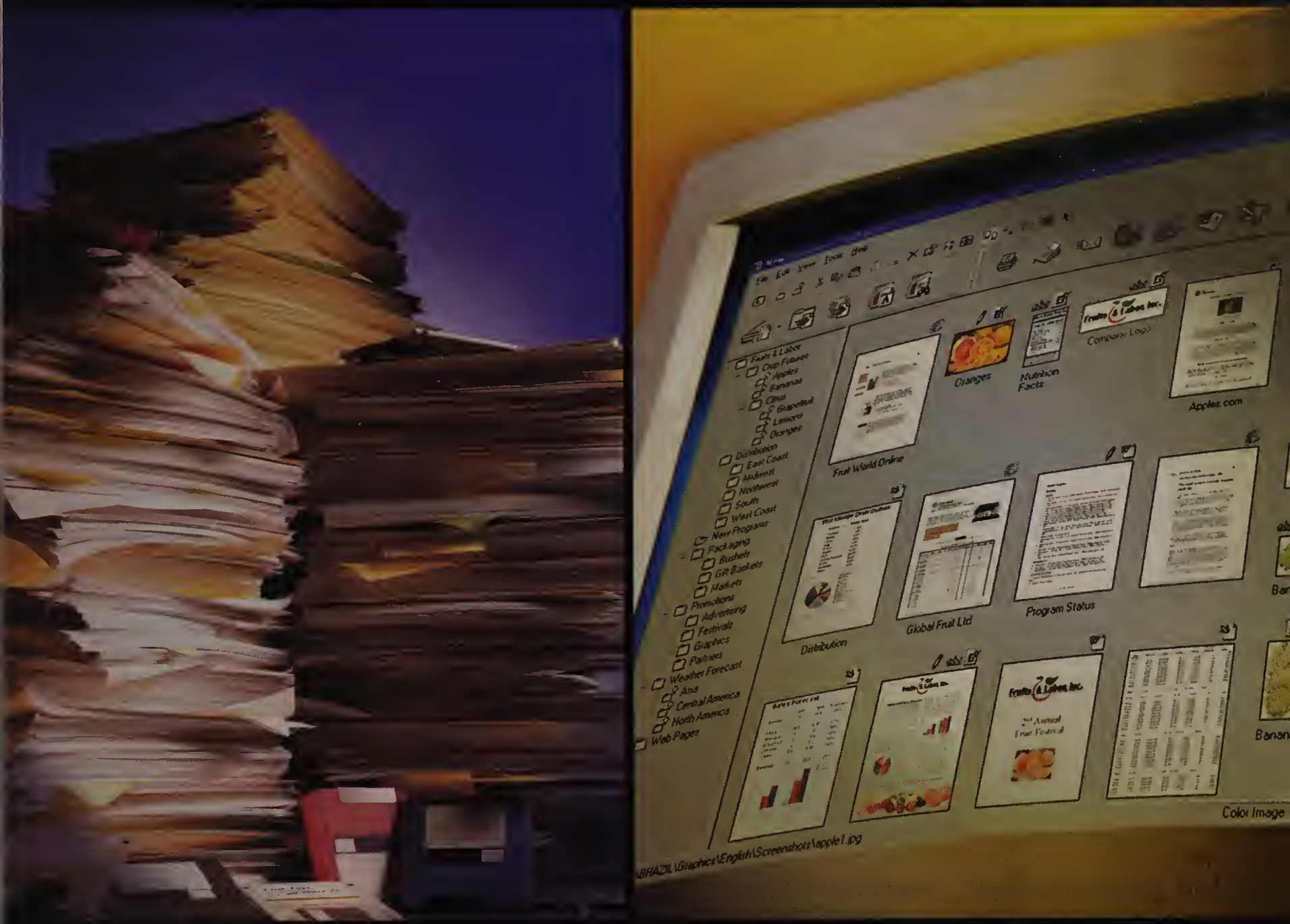

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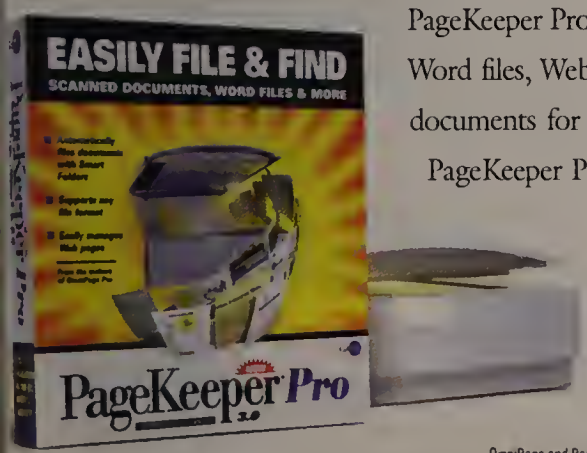

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Make Outlook 98 Work Across Partitions

IF YOU FOLLOWED the tips in our February column for booting both Windows NT and Windows 9*x*, the next thing you'll want to do is install your favorite applications under each operating system. The basic steps are easy: Install applications under one OS on a partition that both OSs can read, then boot the other OS and install the apps again to the same location (see last month's column for more on partitions). You might run into a snag, though, if you use Microsoft's Outlook 98 e-mail and personal information manager program.

Outlook 98's problem is that it assumes you'll use it from within only one OS. I'd already been using Outlook 98 for several months on the Windows 98 side of my Win 98/NT dual-boot system when I finally got around to installing it under NT. To my surprise, Outlook had no clue that I already had a bulging in-box elsewhere on the hard disk. No matter where I looked in Outlook's settings—even in the Windows NT Registry—I found nothing that would let me point the program to the outlook.pst file on my Win 98 partition.

So I tried using brute force to copy the file to Outlook's seemingly static location in Windows NT (\WINNT\Profiles*user*\Application Data\Microsoft\Outlook\, where *user* is my log-on name). After hours of tweaking, I came up with a killer batch file that copied outlook.pst from the Windows 98 partition to Windows NT's, launched Outlook, and then copied the file back again when I exited Outlook. (E-mail me if you'd like to see how it worked.) Sadly, my 35MB outlook.pst file made the whole exercise cumbersome.

That's when I happened upon a simpler solution: If you delete outlook.pst from its default location (noted above), Outlook will ask you where to look for it. Navigate to the existing file's location (select *Start•Find•Files or Folders* to find it first), and then click *OK*. If you want to segregate data from applications (which is a smart idea), you can also use this trick to move your outlook.pst file to a separate data partition or folder.

If you've customized Outlook's Shortcut bar or created any mail rules, those settings are contained in two files that end with .fav and .rwz, respectively, in the directory that contains outlook.pst. The file-deletion trick doesn't work with these files, so you'll have to copy them from the Windows 9*x* location to the corresponding folder on the Windows NT partition. Lastly, if you have Outlook set to automatically archive old messages, they end up in the archive.pst file in the same folder. To ensure that all of your archived messages end up in one place, open Outlook under Win NT, select *File•Archive*, click *Browse*, and then navigate to archive.pst on the Win 9*x* partition and click *OK*. You may also have folder-level autoarchive settings. To point them to the correct archive.pst file, choose *Tools•Options•Other* and then click *AutoArchive*.

Teach NT to Read FAT32

LAST MONTH, we said that Windows NT can't read Windows 9*x* FAT32 partitions (see www.pcworld.com/may99/winNT). It can't, but lots of alert readers have noted a free 715KB utility called FAT32 that enables it to do so. The free version, available on FileWorld, is mostly read-only—you can edit and save existing files, but can't copy files to or create new ones on a FAT32 partition. A full read-write version costs $39. One warning: NT still can't boot from a FAT32 partition. So don't convert your C: drive to FAT32.

NO DEFRAGGER? NO PROBLEM

EVER WONDERED where Windows NT's disk defragmentation utility is? It doesn't have one. Microsoft plans to include a stripped-down version of Executive Software's Diskeeper defrag tool in Windows 2000, the upcoming NT release. But you don't have to wait until then to get your NTFS partition sorted out. You can download the free 1.6MB Diskeeper Lite (see **FIGURE 1**) from FileWorld. After installing it, open Windows NT Explorer, right-click a drive, select *Properties•Tools*, and click *Defragment Now* to launch Diskeeper Lite. You must be logged on as an administrator to install or use the product.

Find files from this article at www.fileworld.com/magazine. Scott Spanbauer is a contributing editor for PC World. *We pay $50 for published questions and tips. See page 14 for contact information.* ■

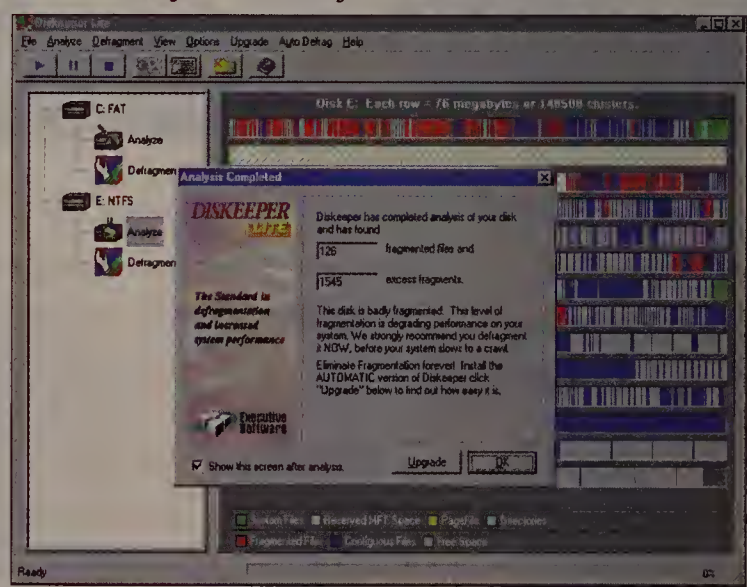

FIGURE 1: GIVE NT DISK PERFORMANCE a boost with Executive Software's free Diskeeper Lite utility.

ILLUSTRATIONS: PHIL ANDERSON (LEFT); JEFFREY PELO (RIGHT)

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YOUR QUESTIONS ON: Whether your PC is Y2K-ready • **Where to get old software**

Two Computers, One Modem, No Problem

I'VE NETWORKED two Windows PCs together. Can I access the Net with one using the other's modem? I'd like to dial up and connect from either PC, and even browse with both at the same time.

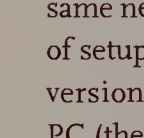
Paul Wittke, Jeffersonville, Indiana

SEVERAL PROGRAMS allow one system—the one with the modem—to work as a proxy Internet server for other PCs on the same network. My favorite, based on ease of setup and price, is PPP Shar. The Lite version gives the client PC (the one without the modem) Web access only; PPP Shar Pro allows the client access to mail, FTP (file transfer protocol), and even Internet-based games. Both products are shareware; a $25 registration fee covers three clients in the Lite version and one in the Pro. Find both on FileWorld.

Both versions have software that is easy to install on the server PC (the one with the modem), and they include instructions for setting up apps on the client PC so that it can access the Internet.

Also, many home network products have modem-sharing capabilities nowadays. For instance, Intelogis's PassPort plug-in network comes bundled with Avirt Gateway Server, a proxy server program. (For more on home networking, see "No-Brainer Home Hookups," page 195.)

SHARING APPS ON ONE PC



WE HAVE FOUR people using one Windows 98 PC. How can we share one program without installing it four times, once for each user's environment?

Andy Scott, Broken Arrow, Oklahoma

USUALLY, copying the shortcuts from one PC's Start menu to another's will let both PCs use the same program.

To access an app installed by someone else, select *Start•Programs•Windows Explorer,* and go to C:\Windows\Profiles*firstuser*\Start Menu, where *firstuser* is the user name of the person who installed the app first. Navigate through the subfolders until you find the shortcut or folder you want. Drag the item to your Start button and hold it over the button until the Start menu pops up. Drop the item into the menu at the desired location.

If you're using Win 95 without Active Desktop, right-click *Start* and select *Explore* to go to your own Start Menu folder, probably C:\Windows\Profiles*yourname*\Start Menu. Select *Start•Programs•Windows Explorer,* and navigate through the subfolders until you find the shortcut or folder you want. Press **<Ctrl>** as you drag the item to the Explorer window displaying your own Start Menu folder.

GET OUTLOOK EXPRESS TO SEE A JOINT E-MAIL ACCOUNT

MY WIFE AND I have a joint e-mail account. Can we set up Outlook Express in each environment so that no matter which of us downloads the mail, we can both read it?

Andy Scott, Broken Arrow, Oklahoma

IT'S EASY TO set up Outlook Express so that two people can share the same mailbox—provided that one of you has not yet launched the program in his or her environment. The first time you launch it, the app brings up a Browse for Folder dialog box (see **FIGURE 1**) in which you tell it where to store your mail. Simply select *Windows\Profiles*otherperson*Application Data\Microsoft\Outlook Express.* Of course, when you set up your mail account, you must use the same information—e-mail address, ISP, and so on—as your partner.

If both of you have already run Outlook Express, you'll have to edit the Registry. Back up the Registry by copying your user.dat and system.dat files from C:\Windows to another folder. Then select *Start•Run,* enter **regedit**, and press **<Enter>**.

Once you're inside the Registry Editor, press **<F3>**, enter ***yourname*\Application Data\Microsoft\Outlook Express**, and press ▶

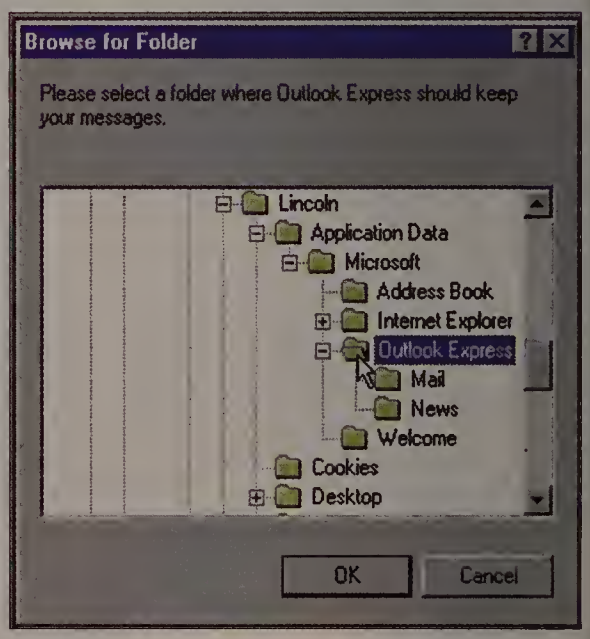


FIGURE 1: TO SHARE AN Outlook Express mailbox, pick the right folder when you first launch the app.

Shortcut to Quitting Windows

WANT TO CREATE a shortcut that will shut down Windows without dragging you through menus and dialog boxes? Right-click the desktop and select *New•Shortcut.* Enter **c:\windows\rundll32.exe user.exe,exitwindows** in the 'Command line' field. Click *Next.* Enter **Exit Windows** as the shortcut's name, and then click *Finish.* If you would like this shortcut to show up as an item on your Start menu, drag it to your Start button, hover until the Start menu opens, and drop the shortcut where you want it to appear.

ILLUSTRATIONS: PHIL ANDERSON (LEFT); JEFFREY PELO (RIGHT)

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Source Code: MU59

<Enter>. When the search finds that string, press <Enter> and change your name in the string to that of the person you're sharing the account with. After you close RegEdit and reboot, your version of Outlook Express will use your partner's mailbox.

Y2K OR NOT Y2K?

ABOUT SIX MONTHS ago I purchased a Compaq Presario 5630. The salesman assured me that it was Y2K compliant, but I decided to test it myself. First I ran NSTL's YMark2000, and the PC passed with flying colors. Then I tried Safetynet's Yes2K, and my Compaq failed the CMOS test. Is my system Y2K compliant?

Kelly Chasney
Newfields, New Hampshire

TWO PIECES OF PC hardware deal with time and date: BIOS code and the CMOS clock/calendar. The CMOS chip's battery lets it track the time and date even when your system is turned off. When you boot your PC, the BIOS chip's start-up routines make the time and date stored in the CMOS chip available to your software.

Few CMOS chips are smart enough to roll over into the next century on their own. That's why your PC failed Yes2K's CMOS test (see **FIGURE 2**). But a Y2K-ready BIOS will treat a CMOS date in 1900 as an error and correct it. So the CMOS test is relevant only if you have software that reads the date directly from the CMOS chip.

Luckily, very few programs read the date directly from the CMOS. One of the handful of exceptions is Safetynet's StopLight, and even it consults the BIOS if the CMOS date looks suspect. I have yet to hear of a Windows business application that draws the wrong century from the CMOS when the BIOS presents it with the right one.

So even if your new Presario can't pass every test you give it, it has passed the ones that count. Nonetheless, getting PC hardware to function properly is the easy part of the year 2000 problem. The hard part is dealing with badly entered and transferred data, and handling small-market and custom-built programs.

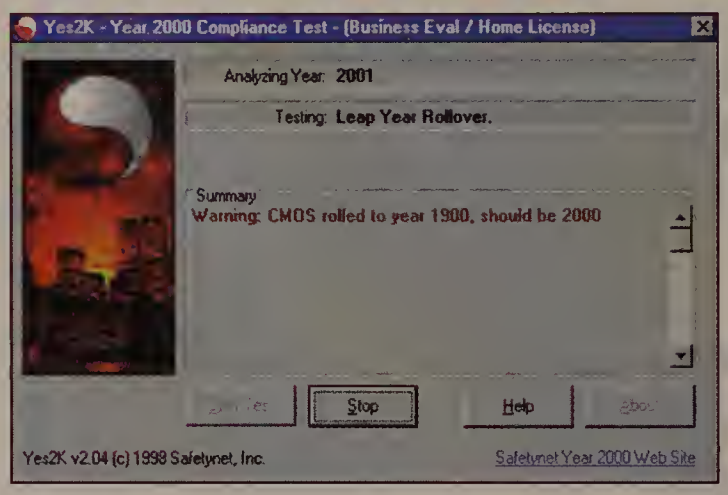


FIGURE 2: SAFETYNET'S YES2K CHECKS your hardware for Y2K compliance and warns you about a likely benign failure.

WHY CAN'T I EXPLORE FROM THE START BUTTON?

AFTER MY upgrade to Windows 98, right-clicking the Start button gives me grayed-out Explore and Open options, robbing me of the easiest and most convenient ways to edit the Start menu. How do I get them back?

Sam Wood, Richland, Washington

FOR REASONS that may forever remain buried deep within Microsoft, Windows 98 turns off these options if you've used Tweak UI (a free Microsoft download) to hide drives from the My Computer window. Windows 95 does no such thing. Consequently, if you hide drives in Windows 95 and then upgrade to Windows 98, those options are suddenly gone.

The easiest way to fix the problem is to use Tweak UI to show the hidden drives. But use the version of Tweak UI in the \tools\reskit\powertoy folder of the Windows 98 CD-ROM. To install it, right-click *tweakui.inf* and select *Install*.

Once you've installed the program, select *Start•Settings•Control Panel* and double-click *Tweak UI*. Then click the *My Computer* tab. Scroll through the list of drives, checking any that are currently unchecked (see **FIGURE 3**). Don't worry—Windows will still display only the drives you actually have. When you're finished, click *Close* and reboot your computer.

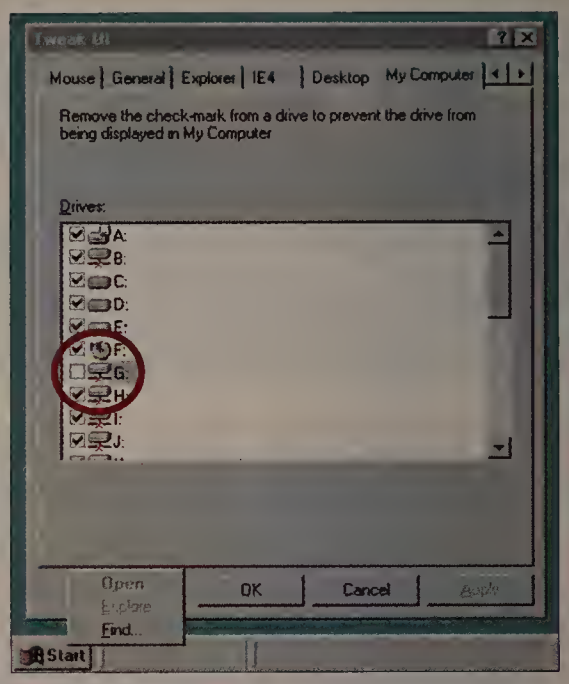
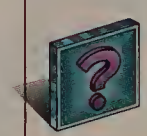


FIGURE 3: UNHIDE ALL DRIVES in Tweak UI to reclaim your Start menu options in Windows 98.

GET BACK OLD SOFTWARE



I USE Microsoft Money 2.0—I have no need for a newer version. But I've lost the floppies this program came on, so I can't reinstall it should the need arise. Microsoft tells me it no longer offers this version. How do I acquire a copy of a program that's no longer made?

Peter Eising, Seattle

MOST SOFTWARE companies have a low regard for their old product; they can't believe that anyone might want software that isn't huge, slow, and weighed down by needless features.

You can find inexpensive *and legal* copies of old software, but you have to go through the proper channels. In many cases (depending on the user license agreement), the original user of a program may sign over all rights to a new user. Stores that sell used software are accustomed to handling all this paperwork.

One place to look for used software is Cyber Exchange (www.cyberexchange.com), a franchise comprising about 40 "brick-and-mortar" stores. By the time you read this, it expects to have a new online system in place that will let you search the inventory of all the stores and mail-order a product from any one of them. The system will also allow people to buy, sell, and trade software. At press time, Cyber Exchange had Money 2.0 available for $10.

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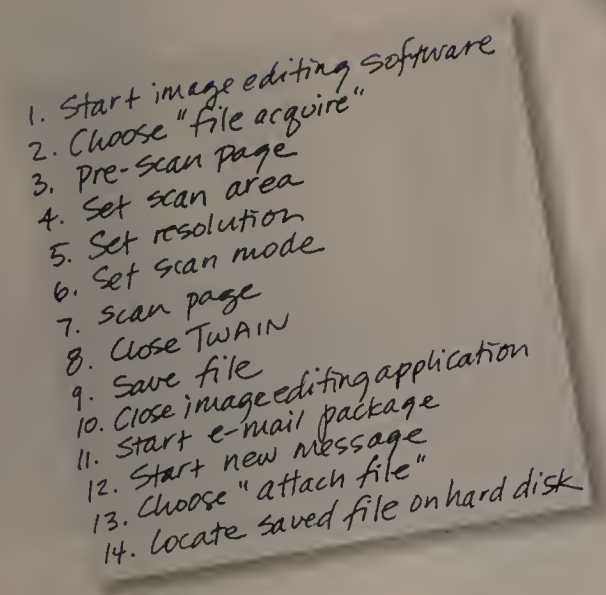

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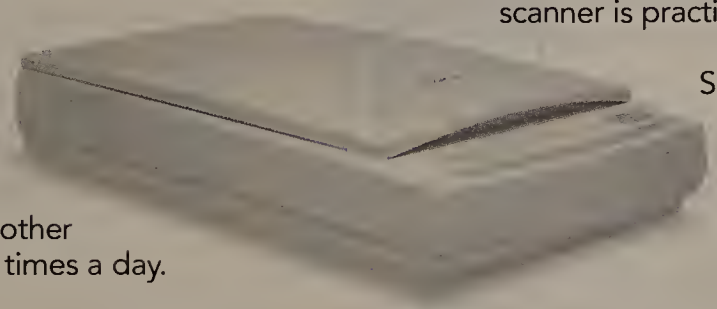

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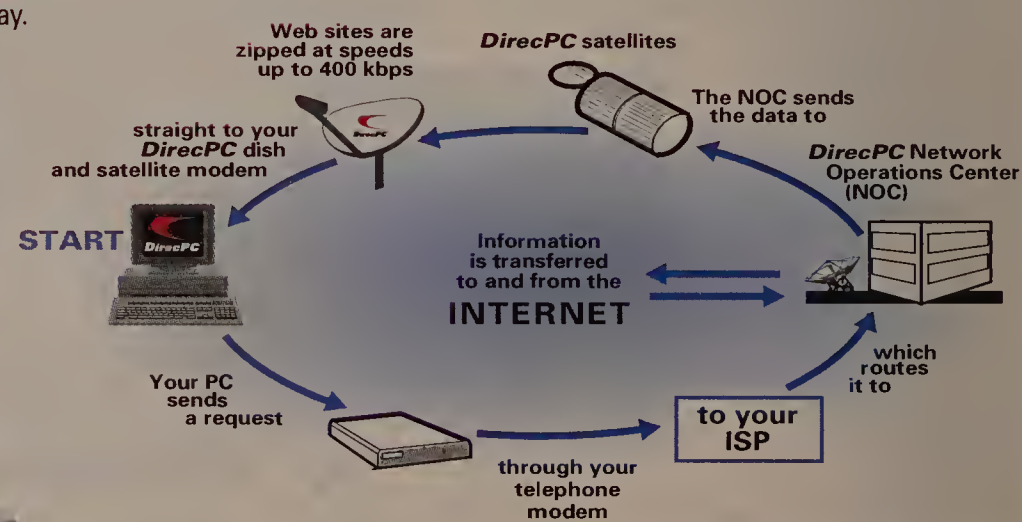

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Price of Service Plan (Without ISP)	$19.99/Month	$34.99/Month	$109.99/Month
Hours of Service (Availability)	24 Hours a Day	24 Hours a Day	24 Hours a Day
On-Line Time (Hours of usage for Turbo Internet)	25 Hours /Month	100 Hours/Month	200 Hours/Month
Additional Hourly Rate (Including ISP) Additional Hourly Rate (Without ISP)	$1.99/Hour $.99/Hour	$1.99/Hour $.99/Hour	$1.99/Hour $.99/Hour
DirecPC Services			
Turbo Webcast: Broadcast delivery of popular Websites to your PC's hard drive	Included	Included	Included
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Turbo Internet: Fully interactive access to the Internet at speeds up to 400Kbps	Included in Online Time	Included in Online Time	Included in Online Time
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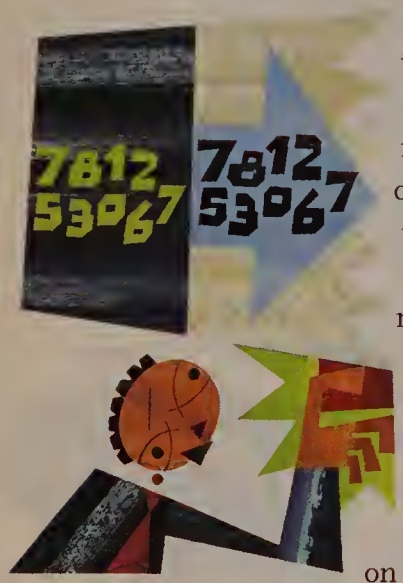
HUGHES NETWORK SYSTEMS

Control menu expansion ◆ Capture screen shots ◆ Use start-up switches

Share Text Among Multiple Documents

COPYING PARTS OF one document to another can be a pain in Word 6, 7, and 97. You have to select the text, copy it to the clipboard, switch document windows, paste the text from the clipboard, then switch document windows again, repeating the process until you're done.

A short macro can help automate the job. To use this macro, open only the source and the destination documents. Next, select the first block of text or the first object that you want to copy, and then run the macro to transfer the material. To specify where you want the copied material to go, click on the desired position in the destination document before making a selection in the source file.



Repeat the procedure as needed until all the copying is done. To speed things up further, add the macro to a toolbar (as described in the next item).

Here's how to set up the MoveIt macro:

Word 97:

1. With Word running, select *Tools•Macro•Macros.*
2. Type **MoveIt** in the 'Macro name' field of the Macros dialog box, then click *Create.*
3. In the macro editor, carefully type the macro text below, including the punctuation characters, between the Sub MoveIt and End Sub lines.

```
Selection.Copy
ActiveWindow.Next.Activate
Selection.Paste
Selection.TypeParagraph
ActiveWindow.Previous.Activate
```

4. Select *File•Save Normal,* and then select *File•Close and Return to Microsoft Word.*

Word 6 and 7:

1. With Word running, select *Tools•Macro.*
2. Type **MoveIt** in the Macro Name field of the Macro dialog box, and click *Create.*
3. Carefully type the macro text below, between the Sub Main and End Sub lines, into Word.

```
EditCopy
NextWindow
EditPaste
InsertPara
PrevWindow
```

4. Select *File•Close* and click *Yes* when you are prompted to save the changes in the macro.

ADD THE MOVEIT MACRO TO A TOOLBAR

HERE'S HOW TO place the macro created above on a toolbar, in three popular versions of Word. (For copying multiple items in Word 2000, see the next tip.)

Word 97:

1. Select *Tools•Customize.*
2. Click the *Commands* tab in the Customize dialog box, then select *Macros* from the Categories list (you'll find it near the bottom of that list).
3. From the Commands list, click and drag *Normal.NewMacros.MoveIt,* and drop it in the desired spot on the toolbar.
4. To replace the text button with an icon, click *Modify Selection* in the Customize dialog box, then select *Default Style* from the pop-up menu. Click *Modify Selection* again, then select *Change Button Image* and click the icon you want to assign to this macro. Click *Close* to finish the job.

Word 6 and 7:

1. Select *Tools•Customize.*
2. Click the *Toolbars* tab in the Customize dialog box, then select *Macros* from the Categories list.
3. Click *MoveIt* in the Macros list, then drag and drop it on the desired toolbar. When you see the Custom Button dialog box, select an icon for the button, or choose *Text Button.* Then click *Assign,* and finally select *Close.*

COPY AND PASTE MULTIPLE ITEMS IN WORD 2000

IF YOU'VE UPGRADED to the new Office 2000, the previous tip is unnecessary. Microsoft has finally heard our pleas and offers its Collect and Paste feature (see **FIGURE 1**) to help users copy multiple items, text, or graphics to the Clipboard, and then paste them in a new document. Here's how it works:

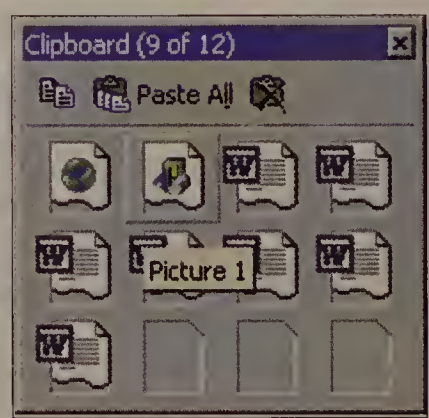


FIGURE 1: OFFICE 2000'S Clipboard gives you the ability to copy multiple items to other documents.

1. With the source document open, right-click any toolbar, then select *Clipboard* from the pop-up menu.
2. Drag the new Office

Make Word Easier on the Eyes

DOES WORD'S editing screen, with black text on a white background, give you eyestrain? Why not change it to a more relaxing blue background with white letters? This is an attractive setup for former users of WordPerfect 5.1 (many of us are still around) who miss their old word processor. Just select *Tools•Options,* then click the *General* tab in the Options dialog box. Click *Blue background, white text* to turn on that feature, then click *OK.* This works in all versions of Word from Word 6.0 to Word 2000.

ILLUSTRATIONS: PHIL ANDERSON (LEFT); JEFFREY PELO (RIGHT)

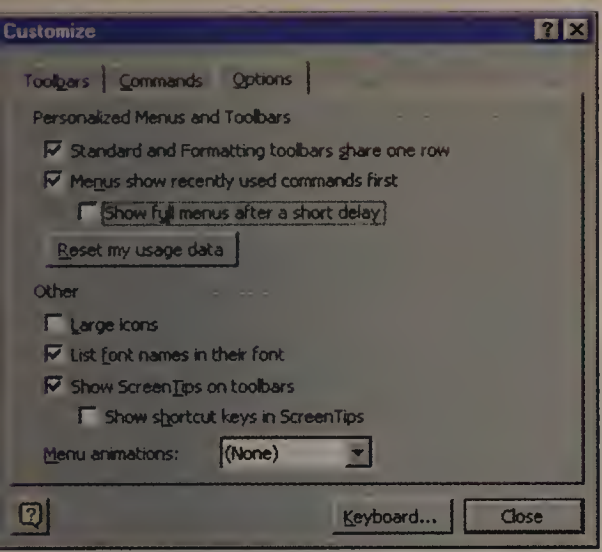


FIGURE 2: DISABLE the dynamic expansion of Word 2000's Personalized Menus.

Clipboard toolbar to a convenient location.

3. Select the text or object you want to copy. Click the *Copy* icon on the floating Clipboard toolbar. Repeat this step for other objects you wish to duplicate.

4. Open or switch to the destination document and position the cursor where you want to paste.

5. To paste one item from the Clipboard, just click that item's icon on the Clipboard toolbar. **Hint**: Hover the mouse pointer over an icon to see the first few letters.

6. To paste the entire Clipboard with all items in the same order you added to it, click the *Paste All* icon.

7. To clear the Clipboard of all entries, click the *Delete* icon.

CONTROL WORD 2000 MENUS

THE NEW Personalized Menus in Word 2000 are pretty cool. They remember which commands you've used and show only those you use the most, plus the basic ones. Seldom-used commands are left unseen unless you click an expander at the bottom of each menu.

Unfortunately, if you open a menu by clicking its name, then take a few seconds to decide which command you want to use, Word suddenly displays all the menu commands. Here's how to turn off that automatic expansion (see **FIGURE 2**):

1. Select *Tools•Customize*.

2. Click the *Options* tab in the Customize dialog box.

3. Click *Show full menus after a short delay* to disable the option.

4. Click *Close*, and you're done.

ADD SCREEN SHOTS TO WORD

WHETHER YOU'RE preparing training documents or just want to insert a picture of a Web site from your browser, capturing program screens and using them in Word documents is a lot easier than you might expect. The trick described below works in all versions of Windows and Word (from 6 through 2000). Note that it will make your Word documents significantly larger because of OLE, the technology Windows uses as "glue" to paste images from the clipboard to a document.

1. With Word running, switch to the application that is displaying the screen you want to capture. Press **<Alt>-<Tab>** to switch between running applications, or click their buttons on the taskbar if you're using Windows 9*x*.

2. To capture a full-screen image, press **<Print Screen>**. To capture just the current active window, press **<Alt>-<Print Screen>**. (If a dialog box is currently active, this keystroke captures just the dialog box.)

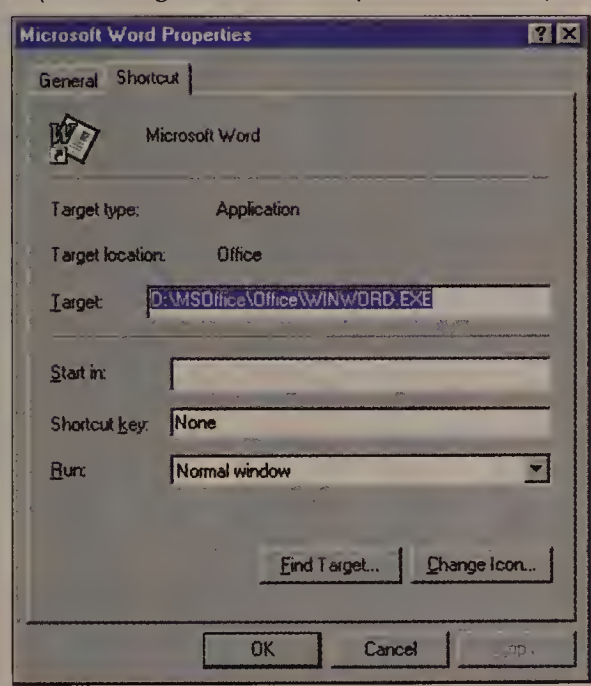


FIGURE 3: EDIT WORD'S command line in this dialog box's Target field to alter its start-up.

3. Switch back to Word, position the cursor where you want the image, then press **<Ctrl>-V** or select *Edit•Paste*.

4. Use Word's tools to resize or crop the image to suit your needs.

START-UP SWITCHES FOR WORD 6, 7, AND 97

YOU CAN BEGIN working faster by customizing the way Word starts up when you click a desktop shortcut or select Word from the Start menu. Here's how to use start-up switches:

To start Word this way...	...add this switch
Start and prevent all add-ins and global templates from loading	/a
Start and prevent any AutoExec macros from running	/m
Run a particular macro at start-up	/m*macroname*
Start with no document loaded	/n

FIGURE 4: START WORK faster by specifying actions to take place at Word's launch.

Right-click the desktop shortcut you use to start Word, and click *Properties*. Or right-click the taskbar and select *Properties* from the pop-up menu. Click the *Start Menu Programs* tab, then click *Advanced*. Locate the Microsoft Word entry, then right-click it and click *Properties*. Click the *Shortcut* tab in the Microsoft Word Properties dialog box (see **FIGURE 3**).

Finally, using **FIGURE 4** as your guide, type a switch after the existing entry in the Target field of the dialog box. Be sure to type a space before the switch (that is, before the slash).

FIX CUT-OFF PAGE NUMBERS

WITH SOME POPULAR ink jet printers, when you insert page numbers in a footer using Word's Insert•Page Numbers command, only part of the number prints. That's because the printer can print no closer than .66 inches from the bottom of the page, while Word prints footers at just .5 inches from the bottom by default.

To change that default in all Word versions (from 6 to 2000), select *File•Page Setup*. In the 'From edge' box of the Page Setup dialog box, click the up arrow on the Footer measurement and change it to read 0.7". Click *Default*, then *Yes* in the confirmation dialog box to apply the change to all Word documents.

We welcome your questions and tips and pay $50 for published items. You can find George Campbell on his Web page at www.osomin.com, or see page 14 for contact information. ■

Extend the Power of Excel With Add-Ins

EXCEL'S A GREAT spreadsheet, but if it can't do what you want, then check out the world of add-ins. Here are some of the best Excel add-ins (including three by yours truly: Power Utility Pak, JWalk Enhanced Data Form, and Sound-Proof).

GENERAL-PURPOSE UTILITIES

Edwin's Power Tools (shareware, $40)
Features include 3D formatting and several text manipulation tools. Available for all versions, including Excel for Macintosh.

Power Utility Pak (shareware, $40)
Highlights include chart exporting and the ability to insert a file at the cursor position. Versions available for Excel 5 and later.

Spinnaker Add-Ins (shareware, $10 to $20)
Several utilities, including tools to filter data and merge databases. Works with Excel 5 or later.

The Spreadsheet Assistant (shareware, $40)
Permits conditional selecting, range selection without screen scrolling, and mathematical operations on a range without formulas. Works with Excel 5 or later.

IMPROVING EXCEL'S FEATURES

Analyse-It ($125 to $325; free demo)
Both general and clinical statistical tools.

JWalk Enhanced Data Form (free; VBA source code, $20)
This alternative to Excel's Data Form (for Excel 97 or later) makes the task of entering data into a worksheet database simpler (see **FIGURE 1**).

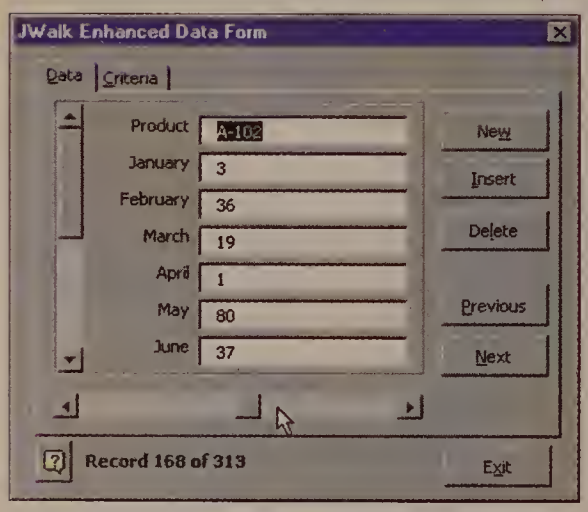
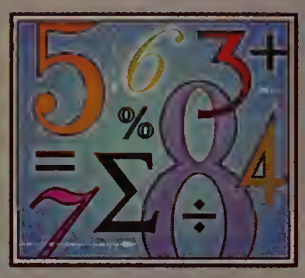


FIGURE 1: THE JWALK ENHANCED DATA FORM improves on Excel's standard Data Form.



Premium Solver
(Frontline Systems, $495 street)
Overcomes size limitations imposed by Excel's Solver feature and finds solutions to much larger problems 3 to 100 times faster than the standard Solver.

XLStat 4.0 ($75 to $145; free demo)
Advanced statistical analysis tools (in English or French) for Excel 5 and later.

BUSINESS PLANNING AND ANALYSIS

Adarus Business Plan ($60; free demo)
Uses a series of wizards to help you to prepare a professional business plan; creates financial reports covering cash flow, income, balance sheet, break-even, and financial ratios. Requires Excel 95 or later.

Crystal Ball ($495; free demo)
Uses Monte Carlo simulation (conducting multiple random trials) to help analyze risks and uncertainties associated with a financial model.

Interval Solver and Interval Calculator ($99; free evaluation version)
Two add-ins help you solve problems by using interval arithmetic.

AUDITING AND PROOFING

Sound-Proof (shareware, $20)
A proofreading tool that uses a synthesized voice to read the values in selected cells. Requires Excel 97 or later.

Spreadsheet Detective ($48 to $160; free evaluation version)
Comprehensive spreadsheet auditing and validation tools, including Y2K auditing.

Getting the Add-Ins

THE PRODUCTS here, except Premium Solver, are available for download from FileWorld. In some cases, the download is a demo version with a time limit or reduced functionality.

Many Excel-related Web sites offer tips, tutorials, macros, and files. My own Web site (www.j-walk.com/ss/excel) contains links to more than 100 other sites. Or see the online version of this column at www.pcworld.com/heres_how. Of course, Microsoft also provides lots of Excel information, available at www.officeupdate.microsoft.com/excel.

MISCELLANEOUS ADD-INS

Cell Watch 97 (free)
Lets you continuously monitor values in multiple cells of various sheets located in different workbooks (see **FIGURE 2**).

Data Recovery ($149; free demo)
Salvages all or part of the data in a corrupted workbook that can't be opened. But only cell data and formula results, not actual formulas, are recovered.

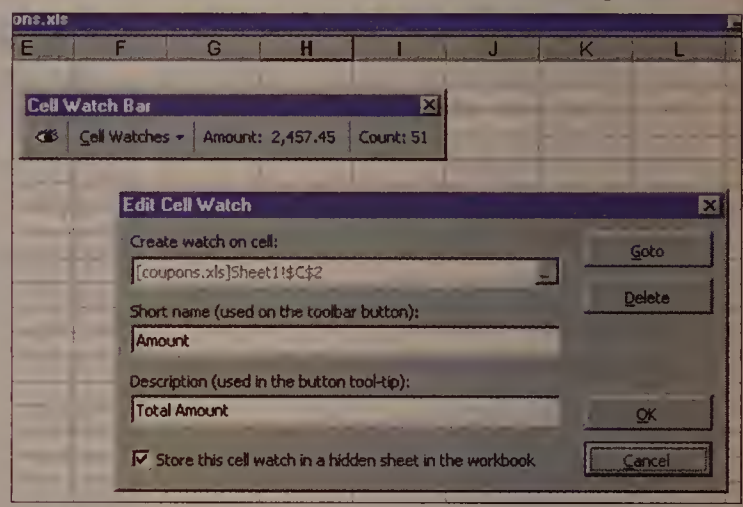


FIGURE 2: THE CELL WATCH ADD-IN displays values from selected cells in a toolbar, visible from any worksheet.

Find files mentioned here at www.fileworld.com/magazine. We pay $50 for published questions and tips. Contributing Editor John Walkenbach, author of Excel 2000 Bible *(IDG Books, 1999), hosts The Spreadsheet Page (www.j-walk.com). See page 14 for contact information.* ■

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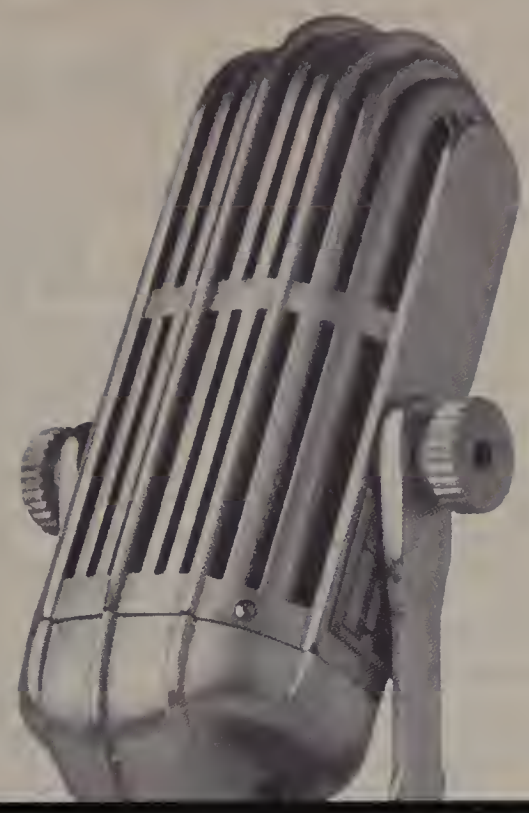

In a developing story,

IDG.net and CNN.com

have been linked in a technology information coup.

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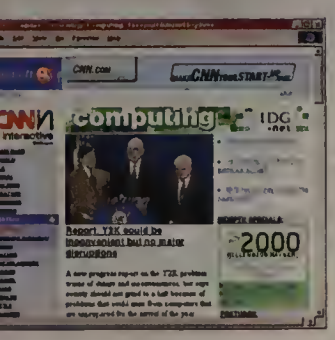

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Monitor system activity with diagnostic utilities ◆ Optimize your swap file

Make the Most of Your PC's Memory

INSUFFICIENT memory can slow down your system's overall performance, keep applications from running properly, or worse, cause your system to lock up, wiping out any unsaved work or data.

The obvious way to avoid memory problems is to install more RAM (especially if you're running Windows 9*x* on 16MB of RAM or less). But before you do that, make the most of your computer's existing memory. Don't worry, it's not as geeky as it sounds: Windows 9*x* provides several tools to help you track down and fix memory-related problems, and to optimize your current memory settings for maximum performance.

GET YOUR METER RUNNING

IF YOU SUSPECT that your computing tasks overwork your PC's memory capacity, play it safe by keeping a watchful eye on Windows' levels of available resources with the System Resource Meter utility. You'll find it under *Start•Programs•Accessories•System Tools•Resource Meter*. If you don't see it there, install it from your Windows CD-ROM via *Add/Remove Programs* in Control Panel. Highlight *System Tools*, click the *Details* button, and select the box next to *System Resource Meter*.

You can see the percentage of free resources you have in your system by placing the mouse pointer over the Resource Meter icon in the System Tray or by double-clicking the icon to bring up the Resource Meter dialog box. If either 'User resources' or 'GDI resources' drops below 25 percent, you should consider closing unnecessary applications and windows. If any resource drops below 10 percent, a warning will appear on your screen. At this point, you're flirting with danger; save your work immediately and close running programs, one by one, to free up memory.

KEEP YOUR EYE ON THE MONITOR

SYSTEM MONITOR is another powerful diagnostic utility included with Windows that allows you to continually monitor a slew of performance statistics for your computer (see **FIGURE 1**). Like the Resource Meter tool, it's either listed on your System Tools menu or can be installed from the Windows CD-ROM.

Select the statistics you want to display from the System Monitor's *Edit•Add Item* menu (refer to **FIGURE 2** for a description of each statistic). As you open more applications and documents, these statistics will help you figure out how quickly your installed physical RAM fills up, when your swap file starts to reach capacity, and which programs hog the most memory.

For a precise measure of how much RAM a given program requires, add up the numbers for 'Other memory' and 'Swappable memory' and then subtract the amount for 'Disk cache'. Do the calculation while the program is running, and again when it's not running; the difference between the two totals is the amount of RAM used by that program.

Another problem users occasionally encounter is memory "leakage." Some applications refuse to release memory they use for specific tasks (or "threads") even after the jobs have been completed. A corrupt program may keep generating new threads, eating up all your available memory. To figure out whether your machine suffers from a memory leak, keep an eye on the 'Kernel: Threads' statistic in System Monitor (Figure 1). Continually increasing numbers of threads—especially when your computing activity is at a minimum—indicate a leak. In most cases, closing and restarting the ▶

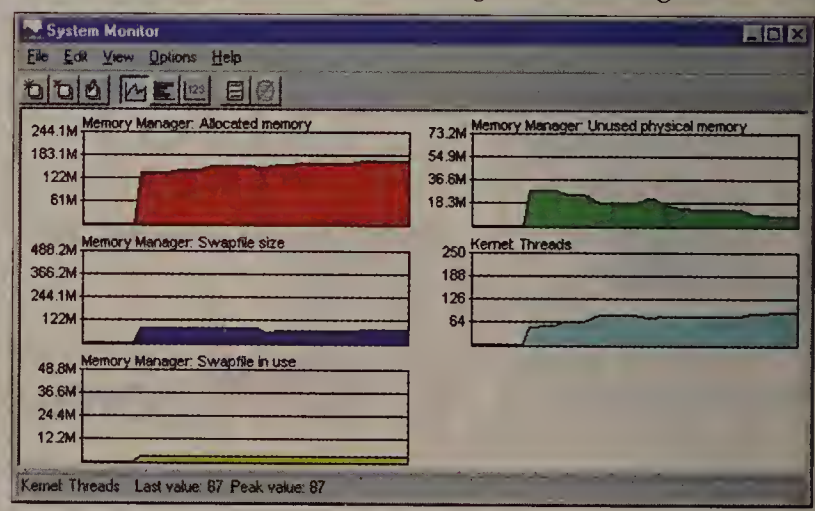

FIGURE 1: WINDOWS' SYSTEM MONITOR has the tools to show you the amount of memory your system uses for various purposes.

Repair Your CD-ROMs

A SMUDGE OR SCRATCH on a CD-ROM can obscure key bits, making the disc useless. But before you throw it away, try cleaning it with a soft cloth and mild, soapy water. Wipe gently from the center of the CD outward—never in a circular motion. Repair kits may also help. We tried the $15 CD Repair Kit from CD Care. It couldn't fix deep or multiple scratches, but it effectively repaired superficial individual scratches. You can find other solutions at www.cdrepair.com, www.discdoctor.com, and www.cdessentials.com.

ILLUSTRATIONS: PHIL ANDERSON (LEFT); JEFFREY PELO (RIGHT)

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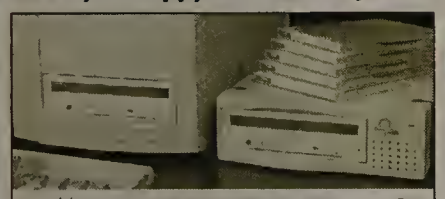

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8x20 SCSI CD ROM RECORDER
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- Tray loading

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Complete Kit with PCI controller	$459

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- CD-R & CD-RW compatible
- Yamaha mechanism
- Includes 5 rewritable disks

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4x4x20 IDE CD ReWritable!
- CD-R & CD-RW compatible
- Yamaha mechanism
- Includes 5 rewritable disks

Drive Kit	$369
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Complete kit with PCI controller	$429

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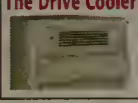

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10.1GB	512k	7200	IBM10GXP	3	$234
14.4GB	512k	7200	IBM14GXP	3	$300
16.BGB	512k	5400	IBM16GP	3	$275
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4.3GB	512k	5400	M90432D	3	$124
B.4GB	512k	5400	M90B45D	3	$152
10.0GB	512k	7200	M91024D	3	$212
13.0GB	512k	5400	M91303D	3	$206
15.3GB	512k	7200	M91536D	3	$295
17.2GB	512k	5400	M91728D	3	$26B
20.4GB	512k	7200	M9204BD	3	$363
SEAGATE					
4.3GB	12Bk	5400	ST34310A	3	$124
6.4GB	256k	5400	ST36422A	3	$139
B.6GB	12Bk	5400	ST38420A	3	$154
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8.4GB	512k	5400	CR30B400A	3	$150
9.1GB	512k	7200	KA309100A	3	$200
12.7GB	512k	5400	CR313000A	3	$215
13.6GB	512k	7200	KA313600A	3	$2B5
1B.2GB	512k	7200	KA31B200A	3	$399
IBM					
1B.0GB	2MB	7200	IBM1BGXP	3	$363
20.3GB	2MB	5400	IBM20GP	3	$33B
22.0GB	2MB	7200	IBM22GXP	3	$450
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4.3GB	256k	5400	WDAC14300	3	$129
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Add on Adoptec A2940U PCI Ultra SCSI controller for $155

SCSI	***RPM***	***Brand***	***Model***	***Price***
4.5GB	7200	Seagate	ST34520N	$215
4.5GB	7200	Seagate	ST34573N	$320
4.5GB	7200	IBM	IBM34560N	$209
6.5GB	7200	Seagate	ST36530N	$259
9.1GB	7200	IBM	I8M39130N	$339
9.1G8	7200	Quantum	XP309100S	$379
9.1GB	7200	Seagate	ST39140N	$349
9.1GB	7200	Seagate	ST39173N	$379
1B.0G8	7200	IBM	IDGHS18Z	$719
1B.2GB	7200	IBM	I8M318350N	$779
18.2GB	7200	Seagate	ST118273N	$689
1B.2GB	7200	Quantum	XP318200S	$689

ULTRA WIDE SCSI HARD DRIVES

Add on Adoptec PCI Ultro Wide SCSI controller for $169

WIDE	***RPM***	***Brand***	***Madel***	***Price***
4.5GB	7200	Seagate	ST34520W	$215
4.5GB	7200	IBM	IBM34560W	$199
4550MB	7200	Quantum	VK304550W	**$239**
4.5GB	7200	Seagate	ST34573W	$320
6.5GB	7200	Seagate	ST36530W	$259
9100MB	7200	Quantum	VK309100W	**$345**
9.1GB	5400	I8M	IBM39130W	$329
9.1GB	7200	Seagate	ST39140W	$349
9.1GB	7200	Seagate	ST39173W	$379
18.0GB	7200	IBM	IDGHS18U	$719
1B.2GB	7200	Seagate	ST118273W	$689

ULTRA-2 SCSI HARD DRIVES

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WIDE	***RPM***	***Brand***	***Model***	***Price***
4.5G8	7200	Seagate	ST34573LW	$320
4.5GB	7200	Quantum	VK304550LW	**$239**
4.5G8	10,000	Seagate	ST34502LW	$465
9.1GB	7200	IBM	IBM39130U2	$349
9.1GB	10.020	IBM	IDRVS9UZ4	$569
9.1GB	7200	Seagate	ST39173LW	$379
9.1GB	10,000	Seagate	ST39102LW	$535
9.1GB	7200	Seagate	ST39175LW	$412
9.1GB	10,000	Seagate	ST39102LW4	$639
9.1GB	10,000	Seagate	ST39103LW	$549
9.1GB	7200	Quantum	VK309100LW	**$345**
9.1GB	7200	Quantum	XP309100LW	$379
18.2G8	7200	Seagate	ST11B273LW	$689
18.2G8	7200	IBM	IDGHS18U2	$719
18.2GB	7200	IBM	IBM318350U2	$789
18.2GB	10,000	Seagate	ST118202LW	$969
1B.2GB	7200	Seagate	ST31B275LW	$799
1B.2GB	7200	Quantum	XP318200LW	$689
1B.2G8	10,020	IBM	IDRVS18ZX	$929
18.2GB	10,000	Seagate	ST118202LW4	$1029
1B.2GB	10,000	Seagate	ST318203LW	$929
36.4GB	7200	Quantum	KN336400LW	$1369
36.4GB	7200	IBM	IDRHS36U2	$1385
36.4GB	7200	Seagate	ST136475LW	$2039
36.4GB	10,000	Seagate	ST136403LW	$2369
50.1GB	7200	Seagate	ST150176LW	$2559

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Mitsumi 4x2x8 ReWritable
Packet write, tray load, huge 2MB buffer
IDE internal w/software, 1 RW disk (CRMC4B02EK) $219
Hotport external (CRMC4B02EHP) $349

Hewlett Packard 4x2x24 CD ReWritable
CD-Writer Plus 8100, writes to CDR (write once) or CDRW (rewritable) media. Packet write, 1MB buffer, tray load. 1 CD-R & 1CD-RW disk.
IDE int w/soft (C4392A)/Ext hotport (C4392HP) $339/$469

4x4x16 CD ReWritable by Yamaha
Int/Ext SCSI (YCRW4416S/YCRW4416SX) $279/$369
Int SCSI w/ controller, sft, 1 RW disk (YCRW4416KIT) $409
Int drive (YCRW4416E) $319
Int IOE w/ software, 1 RW disk (YCRW4416EK) $339
Hotport External (YCRW4416HPK) $479

4x4x20 CD ReWritable by Ricoh
Int IDE tray load, 2MB buffer (MP7040A) $329
Int w/ sft & 1 disk (MP7040AK) $359
Hotport External (MP7040AHP) $459

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Int/Ext Hot Port w-sft & 1 disk (CRMC4801TE/2801TXK) $179/$329

Teac SCSI 4x24
Int/Ext SCSI (CDR56S/CDR56SX) $249/$339

Plextar 4x12
Int/Ext IDE (PXWRITER/PXWRITERX) $295/$385
Int kit w/controller, software, 1 disk (PXWRITERK) $375

Sanyo 8x20
Int/Ext w-sft & 5 disks! (CDR8X20S/CDR8X20SX) $349/$439

Plextar 8x20
Int/Ext w-sft & 1 disk (PXRB20T/PXRB20TX) $459/$549

Color CD Printer
High quality color printing on printable media. Gives a more professional image to your CDs. $999

CD ROM DRIVES

IDE CD ROM

Speed	Brand	Model	ms	Int
32X	Teac	CD532E	85	$67
40X	Mitsumi	CRMCFX40X	85	$64
40X	Pioneer	DRU944	70	$64
40X	NEC	CDR3000	75	$65
40X	Toshiba	XM6502B	79	$67
4BX	Memorex	CD48X	90	$71
52X	Kenwood	UCR412	90	$120

ACCESSORIES *Buy a CD drive & sound card & get a FREE audio cable.*
Creative Labs Sound Blaster PCI 12B (SBPCI12B) $75
Sound Blaster Live! Value/PCI 256 (S8I256VALUE/SBPCI256) $100/182
Prof. speakers w/Bose style swivel speakers & separate subwoofer.
25 Watt (SPEAKERJR) $99 35 Watt (SPEAKERPRO) $129
Universal sound cable(AUDIOMIX) $9
IOE CD ROM case with card and cable (HOTPORT) $139
IDE CD ROM case fpr PCMCIA port (PCMCIACD) $139
ICO CD ROM case for parallel port (PPCASECD) $89

SCSI CD ROM

Speed	Brand	Model	ms	Int
32X	NEC	CDR1910	85	$84
32X	Teac	CD532S	85	$95
32X	Plextor	PX32TS(tray)	85	$115
32X	Plextor	PX32CS(caddy)	85	$159
36X	Pioneer	DRU766S	70	$80
40X	Pioneer	DRU966S	70	$85
40X	Toshiba	XM6401B	79	$95
40X	Plextor	PX40TS	85	$139
40X	New! - Wide SCSI! Plextor	PXTSUW	B5	$169

SCSI CD CHANGERS

Speed	Brand	Model	# Disks	
24X	Pioneer	ORM6324X	Ext 6 Disk	$419

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DVD DRIVES

Toshiba DVD RAM
1xDVD-RAM, 2XDVD-ROM, 16xCDROM, SCSI $439

Creative Labs Encore 5X DVD Kit
Incl. 5X DVD, 32X CD & MPEG-2 decoder $225

Samsung DVD Kit
Incl. 6X DVD, 32X CD & MPEG-2 decoder $209

Tashiba DVD drive
4.BX DVD, 32X CD ROM, IDE/SCSI $130/$169

Pioneer DVD drive
4.8X DVD, 32X CD ROM, IDE/SCSI $135/$175

Sigma Designs MPEG-2 Decader
Award winning Hollywood board $99

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Tapes 3GB(DITTO3)$19, 5GB(DITTO5)$25, 7GB(DITTO7)$29,10GB(DITTO5)$25

EXABYTE

7-14Gig	Bmm, 120MB/min, ELIANT820	$1219
20-40Gig	Bmm, 360MB/min, EXBB900	$2369
70-140Gig	Bmm, 60MB/min, EXB10H	$2689

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4-BGig	DDS-2 DAT, 60MB/min, C1599AI	$679
12-24Gig	DDS-3 DAT, 120MB/min, C1554AI	$B99
72-144G8	DDS-3 DAT, 120MB/min, C564BA	$2279

SEAGATE

2-4Gig	DAT-DC, 66MB/min, STD24000N	$559
4-BGig	DDS-2 DAT, 66MB/min, STD2B000N	$625
12-24Gig	DDS-3 0AT, 132MB/min, STD224000N	$849
25-50Gig	AIT, 360MB/min, STA250000W	$2169
4B-96Gig	DDS-2DAT, 4BMB/min, STL496000N	$2159

SEAGATE MINI CART

4Gig	Mini, 30MB/min, STT28000N	$219
4-8Gig	Mini, 60MB/min, STT28000NC	$359
10-20Gig	TR5, STT220000NC SCSI	$519

SONY

4-BGig	DDS-2 DAT, 90MB/min, SDT7000AI	$549
12-24Gig	DDS-3 DAT, 144MB/min, SDT9000AI	$749
20-40Gig	DDS-4 DAT, 288MB/min, SDT10000AI	$1129
32-64Gig	DDS-2 DAT, 90MB/min, TSL7000	$1799

QUANTUM

20-40Gig	DLT, 1B0MB/min, DLT4000	$1799
	External, our case DLT4000X	$1B99
35-70Gig	DLT, 600MB/min, DLT7000	$4575
	External, our case DLT7000X	$4675

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External for PC parallel port (PPZIP100) $119
External for USB port (ZIP100USB) $149
Zip Plus for PC parallel port (ZIP100PLUS) $165
100MB disks (ZIP100C) Qty 2-9/Qty 10+ $14/$11.5

New! IOMEGA 250MB ZIP External
SCSI for PC, Mac/Parallel Port (ZIP250/PPZIP250) $187

IOMEGA 2Gig JAZ
Int/Ext SCSI (JAZ21/JAZ2X) $279/$315
2 Gig Jaz Disk Sale! Qty 2-4/5-9/10+ $87/$84/$82

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MAXOPTIX
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Int/Ext SCSI-2 (T5-2600/T5-2600X)$1029/$1129
5.2Gig • (2.6Gig, 1.3Gig, 1 Gig, 650MB r/w compatible), SCSI-2, 4MB buffer
Internal SCSI-2 (T6-5200) $1499
External SCSI-2 (T6-5200X) $1599
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SCA DRIVES

SCA2	***RPM***	***Brand***	***Model***	***Price***
4.5G8	7200	Quantum	VK304550SCA	**$239**
4.5GB	10,000	Seagate	ST34502LC	$479
6.5GB	7200	Seagate	ST36530WC	$269
9.1GB	7200	Quantum	VK309100SCA	**$345**
9.1GB	7200	Quantum	XP309100SCA	$379
9.1GB	7200	Seagate	ST39140WC	$345
9.1GB	7200	Quantum	KN309100LW	$429
9.1GB	10,000	Seagate	ST39102LC	$549
18.2GB	7200	Seagate	ST118273LC	$709
18.2GB	10,000	Seagate	ST118202LC	$9B9
18.2GB	7200	Quantum	XP318200SCA	$689
18.2GB	7200	Quantum	KN318200LW	$739
36.4GB	7200	Quantum	KN336400LW	$1369

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The purpose of this notice is to inform you of a proposed settlement of this litigation as explained in detail in a Notice of Class Action Settlement, which you are encouraged to obtain and read in its entirety. You may obtain the Notice of Class Action Settlement by calling 1-800-589-3985, by going online at www.franklin.com, or by writing to Class Counsel at the address below. If you own a REX® PC Companion with TrueSync® Information Manager software or REX® PRO PC Companion with TrueSync® Desktop 1.8 software, you may be a member of the Class and your rights will be affected by legal proceedings in this action.

A hearing will be held at the Hall of Justice, 101 S. 5th Street, Camden, New Jersey in Courtroom 52, before Judge Fluhardy at 2:00 PM on Friday August 6, 1999 (the "Settlement Hearing") to determine: (1) whether the proposed settlement of this action is fair, reasonable and adequate; (2) whether a final judgment should be entered dismissing the litigation on the merits as to Franklin with prejudice to plaintiff and all members of the Settlement Class who do not timely request exclusion; and (3) whether applications to be made by Class Counsel for payment of fees and reimbursement of expenses and an incentive fee award to plaintiff should be approved by the Court.

Under the Settlement Agreement, Franklin will provide Settlement Class Members with new software that will enable the user to maintain a "To-Do Call List" in the order of the user's choosing, and which will also contain upgrades and features that were not present in earlier versions of the TrueSync® software.

You have a right to be excluded from the Class as detailed in the Notice of Class Action Settlement. If you wish to be excluded from the Class you must notify Class Counsel in writing, postmarked by July 12, 1999, at the following address:

Michael J. Boni
KOHN, SWIFT & GRAF, P.C.
1101 Market Street, Suite 2400
Philadelphia, PA 19107

If you properly request exclusion, the terms of the settlement will not be binding as to you. If you do not request exclusion from the Class and the settlement becomes effective, you will be bound by the terms of the settlement.

This is a summary notice only. For more information, call 1-800-589-3985 or go online at http://www.franklin.com. PLEASE DO NOT CONTACT THE COURT.

Dated: April 5, 1999 By Order of the Superior Court of New Jersey, Law Division, Camden County.

Find Useful Statistics in System Monitor

STATISTIC	Description
Allocated memory	Total memory allotted for your system (both physical and virtual).
Disk cache	Total amount of RAM used to cache hard-disk data for faster access.
Swap file size	Current size of the Windows swap file (virtual memory). The swap file stores data overflow when physical RAM is full. Because accessing data stored on the hard disk is much slower than accessing data in physical RAM, heavy swap file use can impair system performance.
Swap file in use	Total amount of memory actually stored in the swap file.
Swappable memory	Total memory that can be swapped to disk.
Unused physical memory (called free memory in Windows 95)	Total amount of fast RAM installed in your PC.
Other memory	"Unswappable" memory, or data that must stay in RAM, such as key Windows files and disk cache.

FIGURE 2: SYSTEM MONITOR TRACKS the various ways in which your PC's memory is allotted. You can access any or all of these statistics from System Monitor's Edit menu.

application releases the trapped memory. If it doesn't, you'll need to close everything and reboot.

SOUP UP YOUR SWAP FILE

WHEN YOUR PC needs to access more data than its installed RAM can store, Windows places the overflow in a large file on the hard disk known as the swap file (often called virtual memory). Since accessing data on the disk is much slower than accessing RAM, you must optimize your swap file's settings. To get to those settings, right-click the *System* icon on your desktop, select *Properties*, and click the *Virtual Memory* button under the *Performance* tab. Once there, do the following:

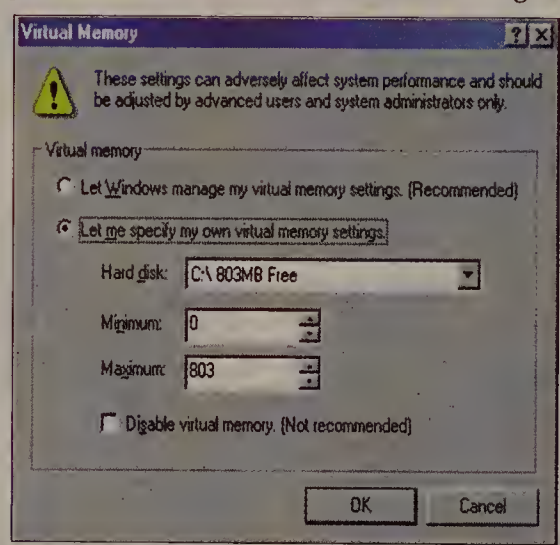

FIGURE 3: ADJUST YOUR swap file settings, such as file size, for maximum performance.

Check the size of the swap file. By default, Windows enlarges and shrinks the file according to its needs. If hard disk space is limited, the swap file can't expand to meet its needs, so you'll have to free up space on your disk.

You can manually set the minimum and maximum file sizes by selecting the *Let me specify my own virtual memory settings* button in the Virtual Memory dialog box (see **FIGURE 3**). Entering the same number for Minimum and Maximum will fix the file's size. This may improve system performance because Windows no longer has to adjust the file size. However, you risk a memory shortage if the file size isn't large enough.

Use the fastest hard disk. If you have more than one hard disk, place the swap file on the disk with the fastest access times. To do this, just change the setting in the 'Hard disk' field in the Virtual Memory dialog box and reboot the system.

Defragment the hard disk. Unlike Windows *3.x*, Windows *9x* allows the swap file to become fragmented on the disk—that is, not stored in a single, contiguous block. In systems that make heavy use of virtual memory, this fragmentation can take a steep toll on performance.

The easiest way to defragment the swap file is to use Norton Utilities' Speed Disk

utility. You can also try Windows 98's Disk Defragmenter utility (under the *System Tools* menu). But since Disk Defragmenter treats the swap file as immovable, you'll first have to move the swap file to a second disk or partition—using the swap file 'Hard disk' setting—then defragment the disk, and finally move the file back. If you have just one disk, check *Disable virtual memory*, reboot, defrag the disk, enable virtual memory, and reboot again. But beware: If your system doesn't have enough RAM to run without virtual memory, it may not boot.

WINDOWS' ILLOGICAL LETTERS

I'VE JUST ADDED a new 12GB EIDE hard drive with two partitions, C: for Windows and E: for applications. My old 1GB EIDE drive is now D:. And my CD-ROM drive is now designated as the F: drive. Is there any way I can return the CD-ROM drive to its old designation of D:?

Cal Jumby, Boston

UNFORTUNATELY, NO. Windows assigns drive letters as follows: Drives controlled at the BIOS level, including most EIDE hard drives, come first. C: is assigned to the primary partition on the primary master EIDE drive—usually the drive and partition with Windows. Subsequent letters are then assigned to the primary partition of every other BIOS-controlled drive in the system. In this case, that's your old drive. Once all the primary partitions are assigned, the remaining partitions receive their drive letters. And finally, Windows assigns a letter to each software-controlled device, such as a CD-ROM or Zip drive.

Kirk Steers is a PC World *contributing editor. We welcome questions and tips and pay $50 for published items. See page 14 for contact information.* ■

CD Repair Kit
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www.cdcare.com
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Upgrade a PalmPilot to a Palm III

IF YOU OWN a Pilot (1000 or 5000) or PalmPilot (Personal or Professional) personal digital assistant and covet the capabilities of the more advanced Palm III, there's a remedy for your PDA envy.

Thanks to the Pilot and PalmPilot units' modular design, with their core applications and operating system in ROM, the readily available Palm 2MB Upgrade can transform your Pilot or PalmPilot into a Palm III. This $129 upgrade adds not only 2MB of RAM but also an infrared port (through a clever modification of the unit's rear panel), the Palm OS 3.0, and new applications. If you're upgrading a Pilot, the only Palm III features you won't have are screen backlighting and a flip-up cover. If you're upgrading a PalmPilot, you'll miss only the cover. Unfortunately, Palm Computing has yet to introduce a kit to upgrade to the new Palm IIIx or Palm V.

Upgrading your PalmPilot or Pilot is easy and fast. Since the task requires you to handle a couple of sensitive memory boards, consider purchasing an antistatic wrist strap from any computer store. If you choose not to use a strap, then be sure to disperse static electricity by touching a grounded metal object, such as the case on the back of your PC, before touching its sensitive components.

Here's how to perform the alchemy.

Stan Miastkowski is a contributing editor for PC World. ■

THE TOP DOWN

Benefits: turns a Pilot or PalmPilot into a Palm III, with more memory, an infrared link, the Palm OS 3.0, and updated applications
Cost: $129 list
Time required: 30 to 45 minutes
Tools required: bent paper clip, antistatic wrist strap (optional)
Expertise level: beginner
Resource: Palm Computing (www.palm.com)

1 Back up your Pilot or PalmPilot data. Before you upgrade your PDA, back up its data to your PC. If your HotSync Manager doesn't start automatically with Windows 95 or 98, start Manager manually (select *Start•Programs•PalmPilot Desktop•HotSync Manager*).

Place your Pilot or PalmPilot in its cradle and press the HotSync button on the cradle. Connection and backup are automatic. You'll see a status screen on your PC, and the PalmPilot will beep when the backup is done.

2 Remove the memory door. Before you go any further, turn off the PDA, slide open the battery door on the rear of the unit, and remove the batteries.

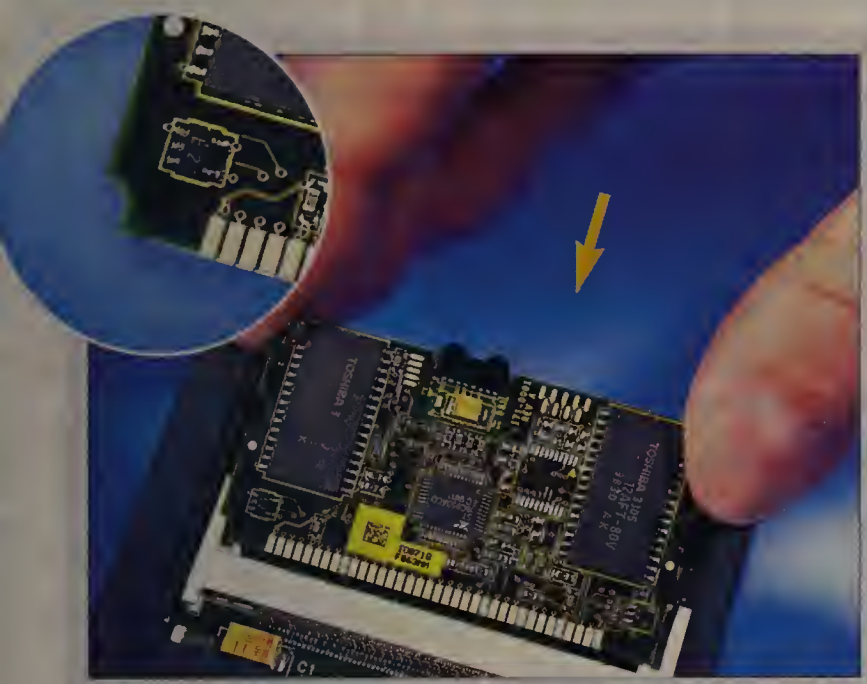
While holding the unit face down in your palm, gently push the straight end of a bent paper clip into the tiny hole below the memory door. At the same time, push the memory door upward with the thumb of the hand that's holding the unit. Primitive tools notwithstanding, this operation takes a fine touch. Be careful not to push the paper clip too hard; you're simply releasing an internal latch.

3 Remove the memory card. Important: Before you perform this step, note that it will remove any add-on applications you've installed in your PalmPilot or Pilot. You'll need to reinstall them after the upgrade.

Depending on the production run of your device, either metal or plastic clips hold the memory card in place. Release each side of the memory card by sliding each clip, one at a time, toward the outside of the case until both sides of the memory card are released. Then gently lift the card upward.

Once the clips are released, remove the memory card by gently rocking it back and forth while pulling it away from the socket it's mounted in.

PHOTOGRAPHS: KEVIN CANDLAND



4 Install the new memory card. Remove the new memory card from its plastic protective bag. Note the notch in one corner next to the connection contacts. For proper placement, this notch must be to the left as you install the new card.

Carefully but firmly insert the new memory card into its connector until it's seated. Check that the card is aligned properly.

Press the module down until the retainer clips snap into place.

5 Install the new memory door. Take the new memory door that came with the upgrade kit, and slide it onto the PalmPilot or Pilot until it clicks into place. Caution: Don't use the original PalmPilot or Pilot door you removed in step 2. The new door provides extra room for components on the new memory board as well as a window for the infrared port you're adding.

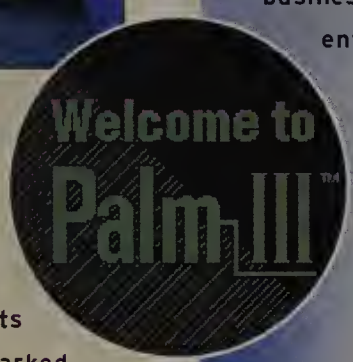
6 Reinitialize, recalibrate, and reinstall. Before your upgrade will work, you need to perform a soft reset. Take the bent paper clip you used to remove the door, and press its end gently into the hole marked Reset, located in the label area on the rear of the PalmPilot or Pilot.

You'll need to recalibrate the screen by tapping on the indicated areas of the screen. Then reset the time and date.

Using the CD-ROM included with the upgrade kit, install the new version of Desktop Organizer on your PC. (Your upgraded PalmPilot or Pilot will still work with the older version of the Desktop Organizer, but the new version adds features that you'll want.)

Finally, reinstall any add-on applications from your PC using HotSync.

7 Test IR beaming.
With its new IR port, your PDA can beam address book entries to and receive them from any other IR-enabled Palm PDA. Test the port by beaming a business card or address entry between your PDA and a friend's.



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*Windows 95. **Windows 98.

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*Windows 98. **Windows NT

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#42559	PCG505TS	300P MMX	64	4.3GB	—	10.4" TFT	V.90	Win 98	$1,799
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#45417	628792U	45D PIII	64MB	8.4GB	4DX	WNT	MI	$1,609
#44365	627583U	45D PIII	64MB	4.2GB	4DX	W98	MT	$1,719
#45419	628796U	5D0 PIII	64MB	8.4GB	4DX	W98	MI	$1,759
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#44398	627594U	5DD PIII	64MB	8.4GB	40X	W98	MT	$2,079
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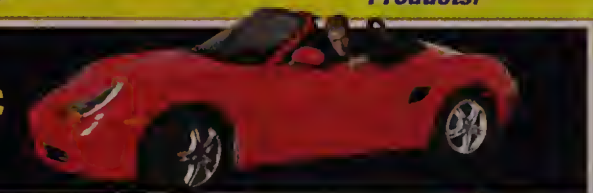

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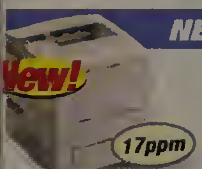

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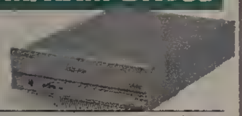

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#31656	Philips 2X/6X/2X CD-RW Internal *(after $50 rebate thru 5/31/99)*	$179.99
#44697	Philips 2X/6X/2X CD-RW External *(after $50 rebate thru 5/31/99)*	$279.99
#43204	Affinity Technologies DVD-ROM III Drive	$129.99

56K V.90 Speed under $20!

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Mach 2 56K V.90 PCI Modem

- Requires Pentium 100MHz or higher, Win 95/98

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56K V.90 PC Card Modem

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- Lucent Technologies chipset
- 3 year warranty

While supplies last. $59.99 #42894

#37405	Boca Tidalwave 56K V.90 Ext. speakerphone modem *	$69.99

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17" Color Monitor Blowout!

K7 Monitor

KI8r — While Supplies Last!

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- .28mm dot pitch
- 1280 x 1024
- 5 year warranty

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#37514	Sony CPD-200ES 17" (16.0 V.I.) *Factory refurbished*	$249.99
#36825	Princeton Ultra 90 19"/18" 1600 x 1200, .26mm *While supplies last.*	$399.99

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#24073	G790	19"/18"	1600 x 1200	0.26mm	$499.99
#32413	PS790	19"/18"	1600 x 1200	0.25mm	$579.99
#25218	VPA150 15" Active Matrix LCD Color Monitor 1024 x 768 .297mm				$1,099.99

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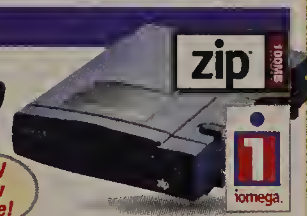
Iomega® 100MB Zip®! $99.99



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Iomega 250MB Zip® Drives

#41337	NEW Zip™ 250MB External parallel port (new-in-box)	$199.99
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Iomega Jaz® Drives

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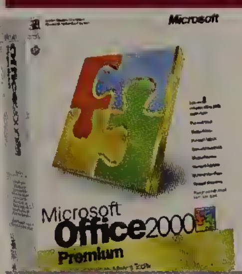
Microsoft Office 2000

Microsoft



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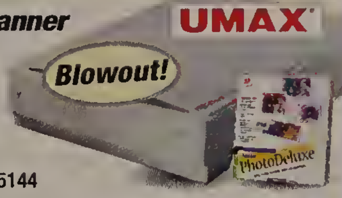
Scanners

Astra 610S SCSI Scanner UMAX



Blowout!

- 30-bit
- PhotoDeluxe
- Fast SCSI interface
- 300 x 600dpi optical, 4800dpi maximum

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#29046	Astra 1220P, 600 x 1200dpi, parallel	$89.99
#29045	Astra 1220, 600 x 1200dpi, SCSI	$149.99
#33584	Astra 2400S, 600 x 2400dpi, 36-bit, SCSI	$299.99

HEWLETT PACKARD

#44478	HP ScanJet 4200Cse Scanner 36-bit Color, 600 x 600dpi, USB	$199.99
#42061	HP ScanJet 5200Cse 600 x 1200dpi, USB and Parallel	$299.99
#34857	HP ScanJet 6200Cse Professional Scanner SCSI and USB	$399.99
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Nikon. New!

New 2.11 megapixel, 1/2 inch CCD with 1600 x 1200 resolution provides photographic image quality at sizes up to 11" x 14"

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#44578	C-2000 Zoom Digital Camera, 2.1 Megapixel, 1600 x 1200 res.	$999.99
#34049	Toshiba PDR-M1 1.5 Million Pixel Digital Camera, 1280 x 1024	$399.99
#32425	DC260 True Megapixel Digital Zoom Camera, 1536 x 1024	$899.99
#44552	DC265 Zoom Digital Camera, 16MB, 1536 x 1024	$999.99
#41195	Sony Mavica FD91, 1024 x 768, 14X zoom, w/40 FREE diskettes	$999.99

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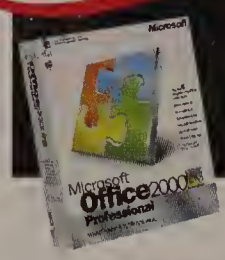


COMPAQ

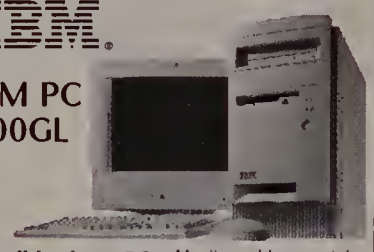
Deskpro EP 4300
Desktop computer

350MHz Intel® Pentium® II processor 512KB Level 2 cache 100MHz Front Side Bus Technology (FSB) 64MB SyncDRAM 4.3GB Ultra ATA hard drive 8MB video memory Windows® 95 3-year limited warranty

Monitor sold separately

$989.00 CDW 127794

IBM



IBM PC 300GL
Small business PC Monitor sold separately

400MHz Intel® Pentium® II processor 64MB RAM B.4GB hard drive 56Kbps modem Windows® 9B Microsoft Office SBE

$1398.37 CDW 142857

COMPAQ

Armada 1750
Notebook computer

333MHz Intel® Pentium® II processor 256KB Level 2 cache 64MB SyncDRAM 6.4GB hard drive 24X Max CD-ROM drive 56Kbps (V.90) modem 14.1" active matrix B.49 lbs. 2.3" thick Windows® 95 1-year limited warranty

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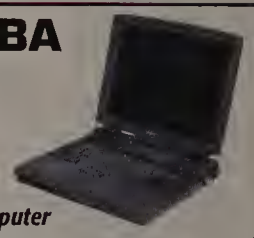

Satellite 4030CDT
Notebook computer

300MHz Intel® Celeron™ processor 12BKB Level 2 cache 64MB SyncDRAM 4.3GB hard drive 24X Max CD-ROM drive 56Kbps (V.90) modem 13.3" active matrix Windows® 9B 1-year limited warranty

$1797.96 CDW 147179

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450 PIII 64MB 14.4GB 40X 56K MS Office W98 ....1769.73
450 PIII 128MB 14.4GB 40X 10/100 MS Office NT 1972.90
500 PIII 128MB 18GB 40X 10/100 MS Office NT 2211.72
500 PIII 128MB 18GB 40X 56K MS Office W98 ....2101.84

Presario
350 AMD K6-2 32MB 4GB 32X 56K 98 ....596.00
380 AMD K6-2 64MB 6GB 32X 56K 98 ....896.00
400 AMD K6-2 64MB 10GB 40X 56K 120MB LS-120 98 ....996.00
450 AMD K6-2 96MB 19GB DVD digital modem 98 ....1396.00
450 PII 96MB 12GB 32X 56K 98 ....1642.00

Deskpro EP towerable desktops
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350 PII 64MB 10GB 32X 95 ....1332.69
400 Celeron 32MB 4.3GB 95 ....820.71
400 Celeron 64MB 6.4GB 32X 95 ....1099.13
400 PII 64MB 10GB 32X 95 ....1373.26
450 PII 64MB 10GB 32X 95 ....1541.9.
450 PIII 64MB 6.4GB 95 ....1442.26
500 PIII 64MB 6.4GB 95 ....1659.06

Deskpro EN Series desktops
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350 PII 64MB 10GB 10/100 NT 1463.48
400 Celeron 64MB 6.4GB 10/100 NT 1210.60
400 Celeron 64MB 6.4GB 95 ....1124.51
400 PII 32MB 6.4GB 95 ....1183.70
400 PII 64MB 6.4GB 24X 10/100 NT 1483.88
400 PII 64MB 4.3GB 24X 10/100 NT 1807.83
450 PII 64MB 10GB 10/100NT 1770.16
450 PII 64MB 6.4GB 95 ....1517.43
450 PIII 64MB 6.4GB 10/100 95 ....1582.34
450 PIII 64MB 6.4GB 10/100 NT 1669.33
500 PIII 64MB 6.4GB 95 ....1738.95
500 PIII 64MB 6.4GB 10/100 NT 1878.45
500 PIII 64MB 6.4GB 10/100 95 ....1811.37
500 PIII 128MB 10GB 32X 10/100 NT 2262.88

Deskpro EN Series mini-towers
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350 PII 64MB 4.3GB 24X 10/100 NT 1780.92
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450 PII 64MB 6.4GB 32X 10/100 NT 1681.74
450 PII 64MB 9.1GB 32X 10/100 NT 2226.13
450 PIII 64MB 9.1GB 32X 10/100 NT 2314.05
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HP Brio BA Series mini-towers
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366 Celeron 64MB 4.3GB 32X 98 ....837.47
366 Celeron 64MB 8.4GB 32X 56K 98 ....1064.68
400 Celeron 64MB 8.4GB 32X 98 ....938.99
433 Celeron 64MB 8.4GB 32X NT 1144.81

HP Brio BAx Series mini-towers
350 PII 64MB 8.4GB 32X 98 ....1086.09
400 PII 64MB 8.4GB 32X 98 ....1156.56
400 PII 64MB 8.4GB 10/100 NT 1206.06
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450 PII 64MB 13GB 32X 56K 98 ....1646.41

HP Vectra VEI Series desktops
366 Celeron 32MB 4.3GB 95 ....907.75
366 Celeron 64MB 4.3GB 10/100 NT 988.44
400 Celeron 32MB 4.3GB 95 ....975.90
400 Celeron 64MB 8.4GB 32X 95 ....988.68
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HP Vectra VLi Series small form factor desktops
366 Celeron 32MB 4.3GB 10/100 95 ....910.56
400 Celeron 64MB 8.4GB 24X 10/100 95 ....1134.43
400 PII 64MB 8.4GB 24X CD 10/100 NT 1363.63

HP Vectra VLI Series desktops
400 PII 64MB 6.4GB 95 ....1241.73
450 PIII 64MB 8.4GB 32X 95 ....1582.52
500 PIII 64MB 8.4GB 32X 95 ....1879.19

HP Vectra VLi Series mini-towers
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450 PIII 64MB 6.4MB 32X 95 ....1608.32
500 PIII 64MB 8.4GB 32X 10/100 NT 2044.18

IBM

IBM PC 300GL Series desktops
350 PII 32MB 4.2GB 98 ....1085.65
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366 Celeron 32MB 4.2GB 98 ....788.63
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350 PII 32MB 4.2GB 98 ....947.59
400 Celeron 32MB 4.2GB 98 ....935.58
400 PII 64MB 6.4GB 32X NT 1359.39
433 Celeron 32MB 4.2GB 98 ....988.74
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IBM 300GL SMB mini-towers
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350 PII 64MB 8.4GB 32X 10/100 MS Office 1309.56
400 PII 64MB 8.4GB 32X 10/100 MS Office 1414.55
400 PII 64MB 8.4GB 32X 56K MS Office 1384.39
433 Celeron 64MB 8.4GB 32X 10/100 MS Office 1285.63
450 PII 64MB 12.8GB 56K MS Office 1638.96
450 PII 128MB 12.8GB 56K MS Office 1729.47
500 PIII 128MB 20.4GB 32X 10/100 MS Office 2235.62

IBM PC 300PL Series desktops
350 PII 64MB 6.4GB 32X 10/100 NT 1507.82
350 PII 32MB 4.2GB 10/100 98 ....1185.7
400 PII 64MB 6.4GB 32X 10/100 NT 1553.92
450 PII 64MB 6.4GB 32X NT 1722.01
450 PIII 64MB 6.4GB 10/100 98 ....1834.60
450 PIII 64MB 13.5GB 40X 10/100 98 ....2176.47
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500 PIII 64MB 6.4GB 10/100 NT 2117.18
500 PIII 64MB 13.5GB 40X NT 2452.89

IBM PC300PL Series mini-towers
350 PII 64MB 4.2GB 32X 10/100 NT 1464.44
400 PII 64MB 6.4GB 32X 10/100 NT 1638.96
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Libretto mini-notebooks
110CT 233MMX 32MB 4.3GB NT V4.0 ....1849.96
110CT 233MMX 32MB 4.3GB 98 ....1698.68

Satellite and Satellite Pro notebooks
2530CDS 300MMX 32MB 4.3GB 13" DS 1357.69
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4010CDT 266/PII 32MB 4.1GB 12.1" AM 24X 1849.60
4020CDT 300/PII 64MB 6.4GB 13.3" AM 24X 2338.48
4030CDT 300/Cel 64MB 4.3GB 13.3" AM 1797.96
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8000 233/PII 64MB 4GB 12.1" AM 24X 2549.48
8000 266/PII 64MB 4GB 12.1" AM 24X 2658.78
8000 300/PII 64MB 6.4GB 13.3" AM 24X 2998.48
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7000CT 266/PII 32MB 4.3GB 12.1" AM NT 2488.78
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7020CT 366/PII 64MB 6.4GB 13.3" AM 98 ....3548.88
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IBM

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Prosignia 100 notebooks
300/PII 64MB 4GB 12.1" AM 98 24X 2239.47
333/PII 64MB 4GB 14.1" AM 98 24X 2738.98
366/PII 64MB 6.4GB 14.1" AM 98 24X 2996.86

Armada notebooks
1700 266/PII 32MB 4GB 12.1" DS NT 1677.87
1700 233/PII 32MB 4GB 12.1" AM NT 1928.88
1700 266/PII 32MB 4GB 12.1" AM NT 2457.87
1700 300/PII 32MB 5GB 14.1" AM 95 ....2648.98
1700 300/PII 32MB 5GB 14.1" AM NT 2756.96
1750 300/PII 32MB 4GB 13.3" AM 95 ....2587.57
1750 300/PII 32MB 4GB 13.3" AM NT 2688.78
1750 333/PII 64MB 6.4GB 13.3" AM 95 ....2986.56
1750 333/PII 64MB 6.4GB 13.3" AM NT 3078.88
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3500 333/PII 32MB 4.1GB 12.1" AM NT 2998.28
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7400 333/PII 64MB 6.4GB 13.3" AM NT 3488.98
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7400 366/PII 64MB 10GB 13.3" AM DVD NT 4196.76
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7800 266/PII 64MB 5GB 13.3" AM 33.6K 3326.56
7800 266/PII 64MB 8GB 14.1" AM 20X 3997.56
7800 266/PII 64MB 8GB 14.1" AM NT 4267.23
7800 300/PII 64MB 8GB 14.1" AM 33.6K 4267.23
7800 266/PII 64MB 8GB 14.1" AM DVD 3689.69
7800 266/PII 64MB 8GB 14.1" AM NT 3889.79
7800 266/PII 64MB 8GB 14.1" AM 33.6K 3889.79
7800 366/PII 64MB 14GB 14.1" AM 95 ....4778.98
7800 366/PII 64MB 14GB 14.1" AM NT 4886.56

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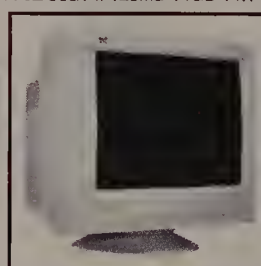
HP OmniBook XE notebooks
266/Cel 32MB 4GB 12.1" DS 24X 56 ....1498.88
266/PII 32MB 4GB 12.1" AM 24X 56 ....1788.78
300/PII 64MB 4GB 12.1" AM 24X 56 ....1998.78
333/PII 64MB 6GB 13.3" AM 24X 56 ....2597.77

HP OmniBook 900 notebooks
300/PII 32MB 4.3GB 12.1" AM 98 ....2476.25
300/PII 32MB 4.3GB 12.1" AM NT 2554.41
366/PII 32MB 6.4GB 12.1" AM 98 ....3376.39
366/PII 32MB 6.4GB 12.1" AM NT 3456.89



ViewSonic on top

GS771
17" monitor with short 14" monitor depth

16" viewable image size 0.27mm dot pitch Maximum resolution: 1280 x 1024 at 66Hz OnView® controls including ViewMatch® color control 3-year limited warranty

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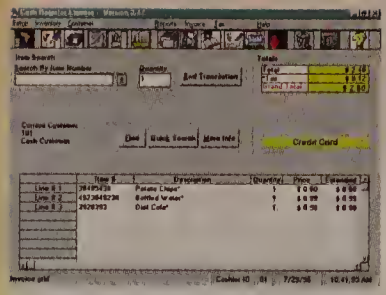

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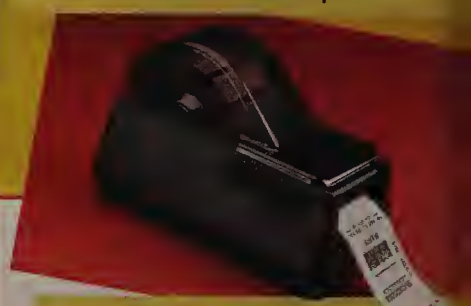

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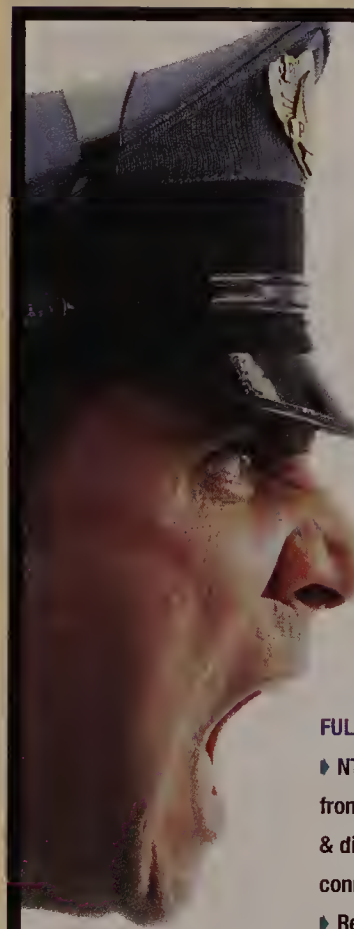

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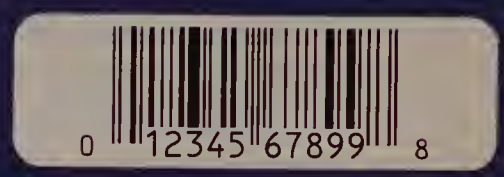

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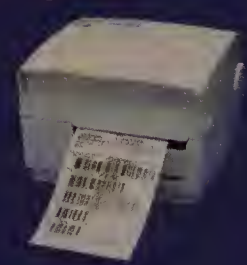

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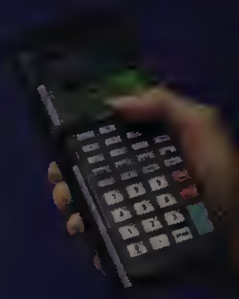

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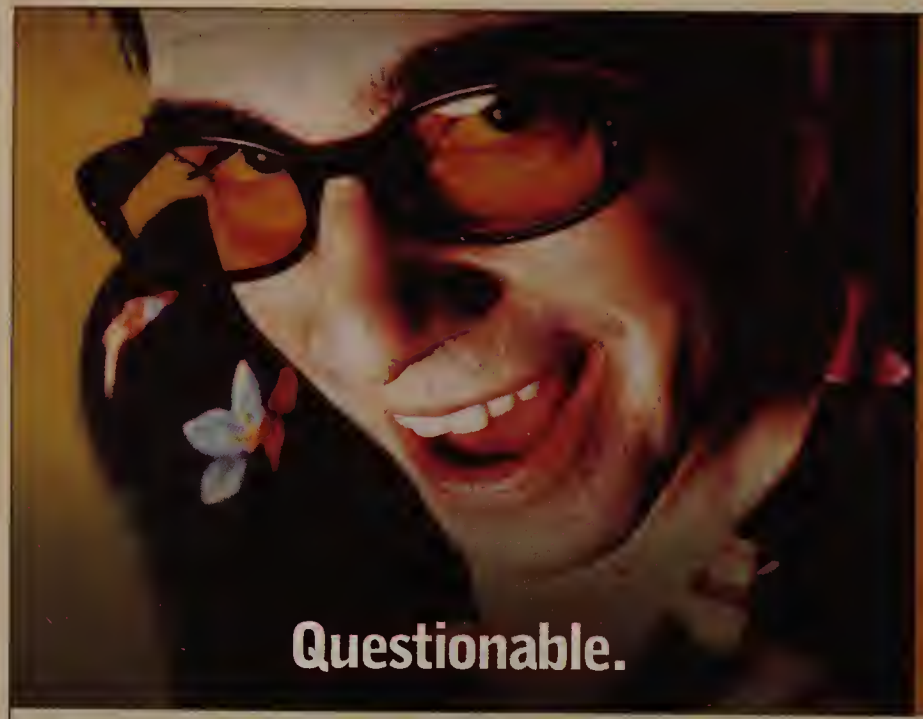

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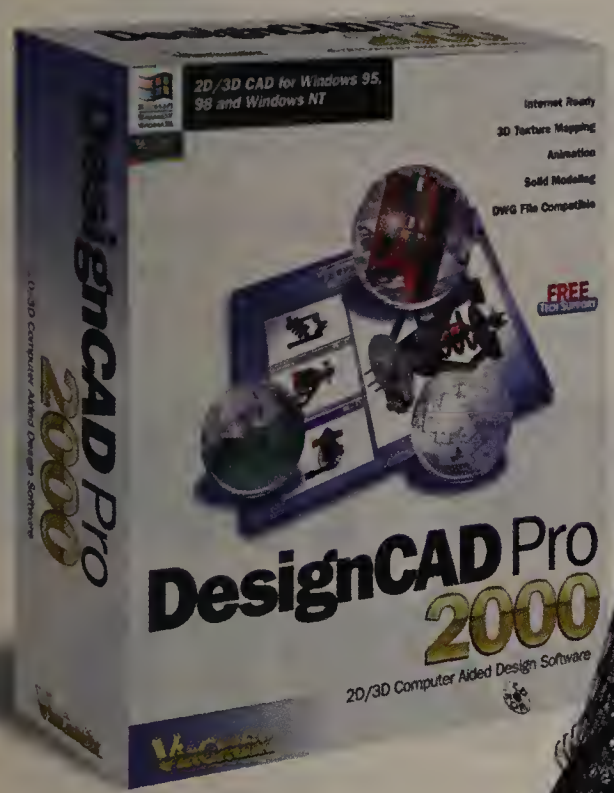

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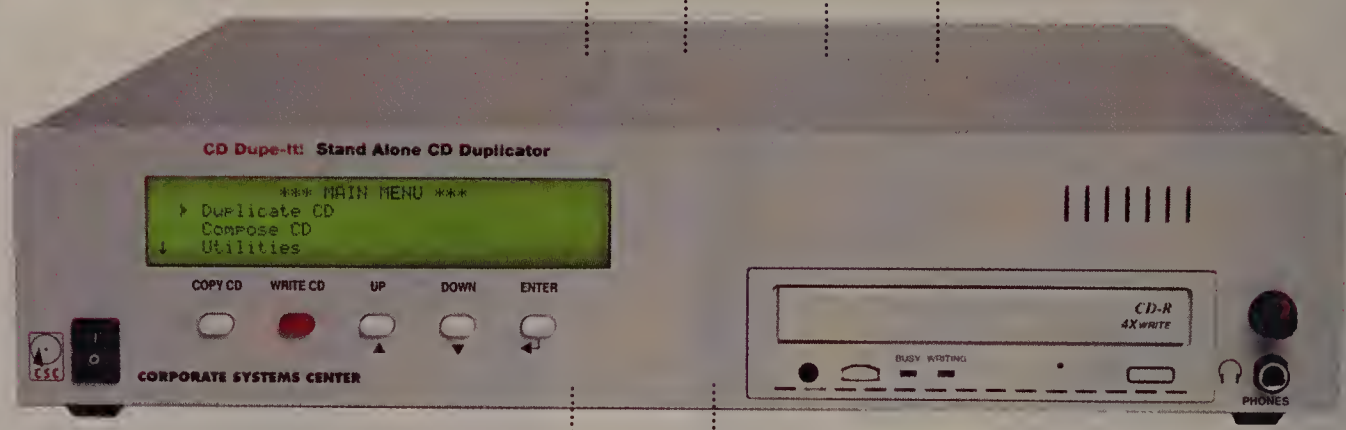

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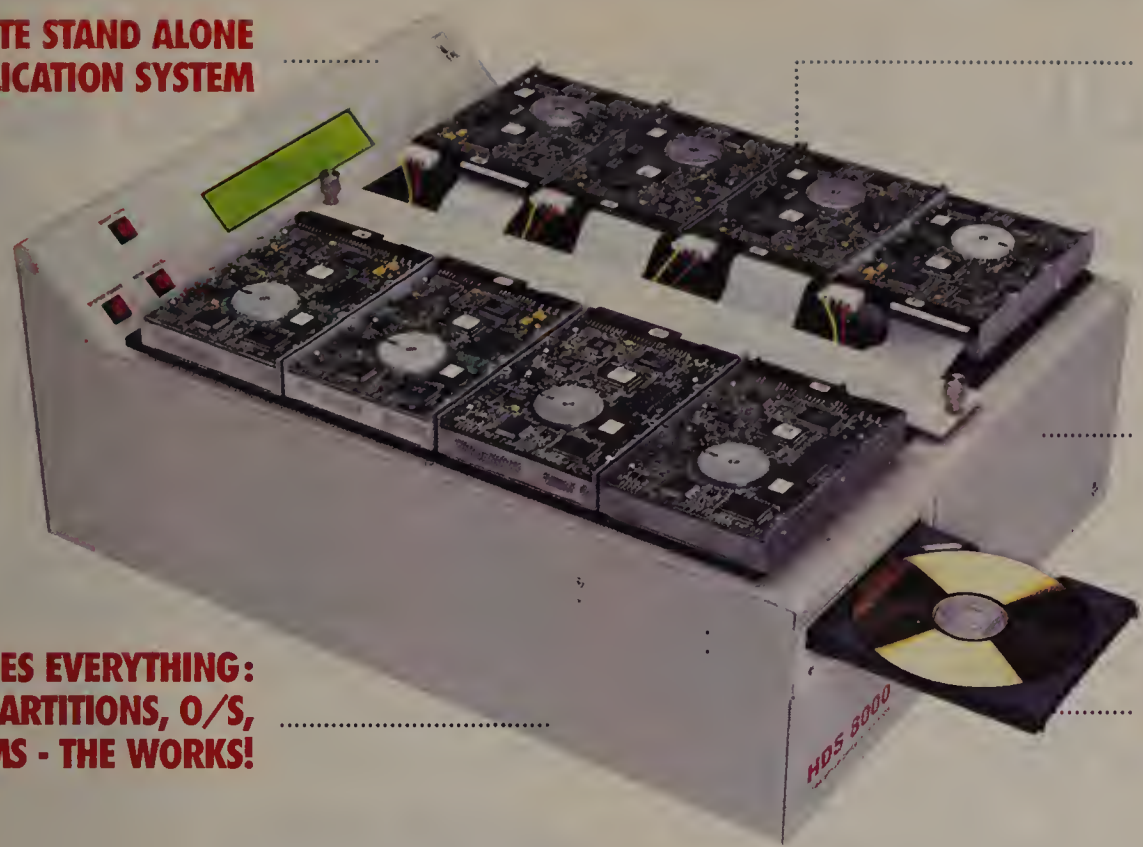

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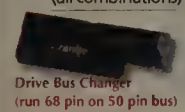

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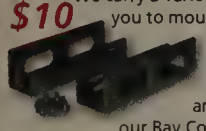

Hot Swap Powered Terminator

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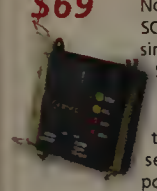


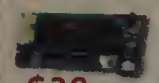
Now you can safely remove any SCSI device from a SCSI chain by simply clicking a switch. The Hot Swap Powered Terminator also has an optional Power Supply so that it can supply termination power to portable setups or when termination power is not being supplied.

Ultra 2 (LVD) Wide Terminator

This is the ultimate terminator on the market. It offers both Ultra 2 (LVD) operation and standard Ultra Wide or Fast Wide operation, all in one unit. Automatically senses which type of bus you are using and configures itself to that bus.

$99

Ultra 2 (LVD) SCA Drive Converter



Converts an 80 pin SCA LVD (Ultra 2) drive into a standard 68 pin LVD. Has a Power Connector and SCSI ID.

$39

SCSIVue Gold Diagnostic Cables

Benefits:
- No Loss Of Important Data
- Faster Performance
- Test Cable Integrity

Features:
- Diagnostic Indicators • Large Ferrite Filters
- Triple Shielding (Unique Design)
- Double Gold 20u" Plated Connectors
- Extra Heavy 26 Gauge Wire • 100 Styles in Stock

From: $39

Teflon® 90 Ohm External Cables

From: $159

Benefits:
- Ultra SCSI 40 MB/s operation
- Fixes Ultra SCSI Cable Problems

Features:
- Perfect 90 Ohm Impedance Match
- Triple Pronged Connector With Gold contacts

Gold .8mm Ultra SCSI Cables

From: $109

Benefits:
- Faster Performance
- Test Cable Integrity
- No Loss Of Important Data

Features:
- New .8mm Ultra SCSI Connector
- Triple Shielding (Unique Design)
- Double Gold 20u" Plated Connectors
- Diagnostic Indicators • Large Ferrite Filters

14 & 29 Bay Ultra SCSI Towers

From: $999

14 & 29 Bay - ***The Ultimate Large SCSI Storage Solutions***
Shown with optional Bay Coolers and Dual Redundant Power Supply. Multiple SCSI Channel Support and Modular Designed Expansion.

RACK MOUNT *8-Bay* Commercial Grade Quality
Shown with optional Bay Coolers and Dual Redundant Power Supply.

From: $399

OPTIONS:
- Ultra SCSI Cable Kit
- Dual Redundant Power Supply
- Bay Coolers w / Brackets
- Temperature Alarm System
- Slide Out (400lbs rated) Rails

Temperature Alarm Systems

Temperature is the number one cause for drive failure. Keeping the drives monitored can now easily be done. Systems include outputs for emergency additional fans and computer notification.

Cool Dual Fan SCSI Cases

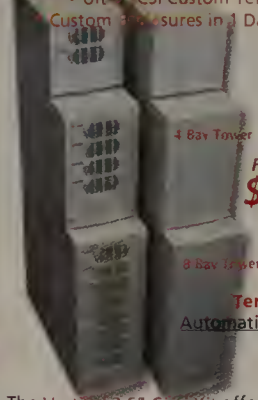
Ultra SCSI COMPATIBLE

$69

Fast SCSI Drives get HOT...but don't worry we have the perfect solution. Our new Dual Fan SCSI Cases keep any drive cool. Temperature is a drives worse enemy.

Gold External Ultra SCSI Cases

- Ultra SCSI Custom Teflon Cable Available
- Custom Enclosures in 1 Day for Raid & Arrays



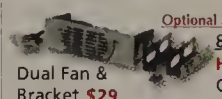
From: $99

Temperature ALARM!
Automatic Monitor & Control

The Vertical 3.5" Case Kit offers a small transportable package. Ideally suited for moving around, this durable case can take a beating. Universal 35 Watt power supply.

$59

Optional 50 or 68 Teflon® Cables Available.



Dual Fan & Bracket $29

Bay Cooler Kit keeps those **HOT Ultra SCSI Drives** COLD as ICE!

HOT SWAP Pull Out Bays
Compatible with all 50 pin & 68 pin SCSI Buses up to Fast SCSI 2. **From: $79.00**

Custom Teflon Internal Cables

Benefits:
- Less Errors, Ultimate Performance
- Silver Wire Improves Signal Quality

Features:
- Perfect 90 Ohm Impedance • Custom in 1 Day
- Triple Pronged Connector - Gold contacts Silver Wire

From: $39

68 Pin Internal Cables, custom or stock, from 1 to 15 SCSI devices per cable. We can also make Custom 68 pin and 50 pin Combination Cables that allow you to use narrow drives on a wide cable.

Teflon® is a registered trademark of DuPont

Active Digital SCSI Repeater

From: $99

Benefits:
- Models for all SCSI types
- Fixes SCSI Cable Problems

Features:
- Doubles Cable Length (up to 18')
- Active Termination and Signal Purification
- Ultra Fast Performance for Added Capabilities
- Diagnostic Capabilities • 30u" Gold Contacts

Internal Repeater

If you integrate SCSI Raids or Arrays and are having problems making it work, the Granite SCSI Repeater will make it work. Designed to fit inside any computer or external case. These repeaters will double the cable length of any scsi bus allowing you to achieve the needed distance to make your system operate. Up to 2 repeater can be used per channel.

SCSI Cable Tester - LED Readout

This Digital SCSI Cable Tester can test all the popular cable styles for opens, shorts, and unreliable operation. Battery powered for easy use anywhere you need it. Three models to choose from:
- 50 pin IDC
- 50 pin Centronics
- 68 pin MicroD

From: $29

The Book of SCSI - An Adventure

$34

Considered "The Bible" of SCSI Books, it includes chapters on SCSI Basics thru Advanced SCSI. Written so that all of us can understand it, this is a reference guide that can be used by anyone. Its the best SCSI we have seen.

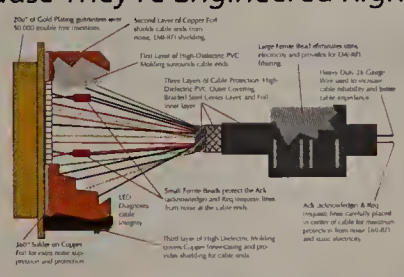
SCSIPRO Utilities - SCSI Repair

A combination of SCSI Utilities that helps you manage and diagnose SCSI problems. Allows you to set the drive for AV or Data optimization. Does custom block by block copies. Allows you to monitor SCSI operations. For Windows 3xx, 95 and NT.

$99

Granite Cables Are The Best Because They're Engineered Right.

Granite Cables were designed by SCSI Engineers to be the **Best Cables On The Market.** Everything about them means better performance and higher reliability. Our design incorporates an exclusive shield that protects the Acknowledge and Request lines from noise. Large Ferrite beads are installed on all cables to protect them from static and noise. Every cable incorporates a LED indicator that lets you know it is operating properly. We also use more GOLD on every cable. Add to this our impedance matching techniques and you have most of what makes us THE BEST!



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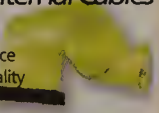
FREE... Color ***Catalog*** *also available* ***Call 510-471-6442*** *or* ***SEE*** *www.scsipro.com*

Ultra 2 (LVD)-TPO Internal Cables



Benefits:
- Less Errors, Ultimate Performance
- TPO Shield Improves Signal Quality

Features:
- Perfect 132 Ohm Impedance • Custom in 1 Day
- Triple Pronged Connector - Gold contacts Silver Wire

From: $39

68 Pin Internal LVD Cables, custom or stock, from 1 to 15 SCSI devices per cable. The perfect cable for LVD. We usually take just 1 to 2 days to process all orders, including custom cables!

What is Ultra 2 (LVD) ? • How fast is Ultra 2 (LVD) ?

This is the fastest SCSI available! Twice as fast as Ultra 1 SCSI and without any of its limitations. If you want true horsepower this is the Ultra SCSI system to buy. Completely backwards compatible with Ultra 1 SCSI, Fast SCSI, and SCSI 1 & 2! The key to this new SCSI Standard is the use of Low Voltage Differential Technology. Also known as (LVD) and Ultra 2 SCSI, we can now achieve speeds that far exceed even the fastest computers data thruput capabilities.

Ultra 2 (LVD) - SCSI Repeater / Converter

Now you can take all your SCSI devices and run them any distance you want, (up to 75 feet) while sharing the Ultra 2 SCSI bus. This revolutionary Repeater / Converter will give you, not only long cable distance, but also complete compatibility with the new Ultra 2 standard. There is no need to have two SCSI Adapters taking up precious PCI slots. Two models are available, the internal model that mounts into your enclosure, Raid/Array case, and the external that can be used anywhere.

$199 $249

Granite D•I•G•I•T•A•L

Online Catalog at... www.scsipro.com *The SCSI Solution Company*

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DIMMS (168 pin)

SDRAM	x64	x72 ECC	PC-100	PC-100 ECC	CAS LATENCY 2 PC-100	CAS LATENCY 2 PC-100
8Meg	—	—	—	—	64 Bit	72 Bit ECC
16Meg	32	39	39	44	Non-Reg. / Registered	
32Meg	49	63	59	69	—	—
64Meg	99	119	119	139	119 / 149	139 / 159
128Meg	199	229	224	269	239 / 299	269 / 309
256Meg	569	639	719	799	899 / 689	899 / 749

INDUSTRY STANDARD DIMMS

Unbuffered	16Mg	32Mg	64Mg	128Mg	256Mg
3.3V ECC, EDO	39	64	119	239	—
3.3V EDO	39	59	129	219	—
Buffered					
3.3V ECC, EDO	39	75	124	249	529

72 PIN SIMMS (FPM, EDO)

	60NS	70NS	80NS
1 x 32 4 mg	8	8	8
2 x 32 8 mg	15	15	15
4 x 32 16 mg	25	25	-
8 x 32 32 mg	46	46	-
16 x 32 64 mg	119	119	-
1 x 32 4 mg EDD	10	10	-
2 x 32 8 mg EDD	17	17	-
4 x 32 16 mg EDD	36	36	-
8 x 32 32 mg EDD	62	62	-
16x32 64 mg EDD	129	129	-

	60NS	70NS	80NS
256 x 36	-	14	14
512 x 36	-	3	-
256 x 32	-	3	-
512 x 32	-	4	-
1 x 36 4 mg	14	14	14
2 x 36 8 mg	26	26	26
4 x 36 16 mg	49	49	-
8 x 36 32 mg	98	98	-
16 x 36 64 mg	175	175	-

MOTHERBOARDS

P-75 – P233MMX, 4PCI, 4ISA 79.00
AMD K6-2, 100 MHZ Bus 89.00
Pentium II, BX Chipset, PC-100 109.00

SIMM MODULES

	60NS	70NS	80NS
1Meg x 3 (3 chip)	4.00	4.00	4.00
1Meg x 9 (9 chip)	4.00	4.00	4.00
4Meg x 3 (3 chip)	13.00	13.00	-
4Meg x 9 (9 chip)	15.00	15.00	15.00
16Meg x 9 (9 chip)	59.00	59.00	-

CPU CHIPS

INTEL					
Pentium II Xeon 450MHZ	$925	Pentium II 2668 MHZ	149	486 DX2-66/DX4/100	25/45
Pentium II Xeon 400MHZ (1M)	1895	Pro 200 512K/256K	795/295	Celeron 400/366/333	149/109/95
Pentium II Xeon 400MHZ (512K)	795	Pro 180/150	125/95	Celeron 300A/300	89/89
Pentium III 500 (Katmai)	699	Pentium 233MMX	79	AMD	
Pentium II 450/400 MHZ	529/299	Pentium 200/200 MMX	199/69	K6-2-400/-350	179/105
Pentium II 350/333 MHZ	189/169	Pentium 166/166MMX	59/89	K6-2-333 (66MHz/95MHZ)	89/89
Pentium II 333/300 MHZ	249	Pentium 150/133/120	69/55/49	K6-2-300 (66MHZ)	79
		Pentium 100/90/75	49/39/29	K6-2-300 (100MHZ)	79

DELL MEMORY

Dimension XPS D233, D266, D300, D333 (SDRAM)	32/64/128Meg	59/99/199
Dimension XPS D233, D266, D300, D333 (ECC)	32/64/128Meg	63/119/229
Dimension XPS 133S, 166S, 200S, P133V, P200V (SDRAM)	16/32Meg	39/69
Dimension XPS R350, R400, R450 (PC-100)	64/128Meg	119/229
Dimension XPS V333, V333C, V350 (PC-100)	32/64/128Meg	69/119/229
Dimension XPS M166A, M200A, M200S (SDRAM)	16/32Meg	39/69
Dimension XPS Pent II H233, H266 (EDO pairs)	8/16/32Meg	19/44/79
Dimension XPS P100C, 120C, 133C, 166C (EDO pairs)	4/8/16/32Meg	11/19/44/79
Dimension XPS P60, P75, P90, P100 (FPM pairs)	4/8/16/32Meg	10/19/49/89
Optiplex GM, GMT P75, P90, P100, P120, P133, P166 (EDO pairs)	4/8/16/32Meg	11/19/44/79
Optiplex GNT, N Series (EDO Dimm)	32/64/128Meg	49/99/199
Optiplex GX Pro 180, 200 (SDRAM)	32/64/128Meg	59/99/199
Optiplex GXI (EDO ECC)	32/64/128Meg	64/119/239
Optiplex GX1 (ECC PC100)	32/64/128Meg	69/119/229
Optiplex GN/GNT 166, 200, 233 (EDO Dimm)	32/64/128Meg	49/99/199
Optiplex XL, XM, XMT (FPM pairs)	8/16/32Meg	19/49/89
PowerEdge 2100, 2200, 4100, 4200 (EDO, ECC)	32/64/128/256Meg	64/119/239/529
PowerEdge EL, SP, SP2 (FPM pairs)	8/16/32Meg	26/49/89

IBM APTIVA, PC, P/S1 & P/S2

Aptiva 300, 500 Series	4Meg/8Meg/16Meg/32Meg	11/19/29/49
Aptiva 2136 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	11/19/29/49
Aptiva 2137, 2140, 2142 (SDRAM)	16Meg/32Meg/64Meg/128Meg	39/59/109/209
Aptiva A, M, 300, 500, 700 Series	4Meg/8Meg/16Meg/32Meg	11/19/29/49
Aptiva C, S,L Series (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	11/19/29/49
PC 330 Models 6571-6576	4Meg/8Meg/16Meg/32Meg	11/19/29/49
PC 330 Model 6577 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	11/19/29/49
PC 350 Models 6581-6585	4Meg/8Meg/16Meg/32Meg	11/19/29/49
PC 350 Model 6586 (pairs)	4Meg/8Meg/16Meg/32Meg	11/19/29/49
PC 350 Model 6587 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	11/19/29/49
PC 730 Models 6875-6876 (pairs)	4Meg/8Meg/16Meg/32Meg	11/19/29/49
PC 730 Model 6877 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	11/19/29/49
PC 750 Models 6885-6886 (pairs)	4Meg/8Meg/16Meg/32Meg	11/19/29/49
PC 750 Model 6887 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	11/19/29/49
PC Server 310 (pairs)	4Meg/8Meg/16Meg/32Meg	11/19/29/49

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IBM NOTEBOOK/LAPTOP MEMORY

MODEL	AMT. UPGRADED	MEMORY PRICE	BATTERY NimH/Li-on
Thinkpad i Series	32/64/128Meg	79/149/429	
Thinkpad 310E, ED, 315	16/32Meg	49/79	
Thinkpad 340, 345, 355, C, CS	4/8/16Meg	44/54/79	119/—
Thinkpad 360C, CE, CSE, P, PE	4/8/16Meg	44/54/79	105/—
Thinkpad 365X, 365XD	8/16/32Meg	29/49/79	105/—
Thinkpad 380, 380D, 380E, 385ED, 385XD	16/32/64Meg	49/79/139	119/236
Thinkpad 560, 560E, 560X	8/16/32/64Meg	29/49/79/139	241/—
Thinkpad 600, 770, ED (SDRAM)	16/32/64/128Meg	39/79/139/399	
Thinkpad 700, 720, 750, CL57SX	4/8/16/32Meg	54/79/90/199	140/175
Thinkpad 701, 701C, 701CS	4/8/16/32Meg	18/29/49/89	119/—
Thinkpad 755C,CE,CD,CS,CDV,CSE,CV	4/8/16/32Meg	44/54/79/189	140/271
Thinkpad 760C, CD, L, LD	8/16/32Meg	29/49/99	140/271
Thinkpad 760E, ED, EL, ELD	8/16/32Meg	29/44/79	140/271
Thinkpad 760XD, 760XL	8/16/32Meg	29/44/79	140/271
Thinkpad 7650, 765L	8/16/32/64Meg	29/44/79/139	140/271

GATEWAY MEMORY

Dest. Big Screen 05 – SDRAM	16/32/64Meg	29/69/109
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Family PC w/MMX – SDRAM	16/32/64Meg	29/69/109
G5-166, 200 Prof System – SDRAM	16/32/64Meg	29/69/109
G5-166M, 200M MMedia System – SDRAM	16/32/64Meg	29/69/109
G6-200 Prof. System – SDRAM	16/32Meg	39/69
G6-Prof. M MMedia System – EDD	4/8/16/32Meg	6/19/45/89
Multimedia G-5 Systems – SDRAM	16/32/64Meg	29/69/109
Prof. P-5 Series – SDRAM	16/32/64Meg	29/69/109

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LASER PRINTER MEMORY UPGRADES

AMOUNT UPGRADED	256k	1	2	3	3.5	4	5	8	16	32
Brother 630, 631, 641, 645	–	39	59	–	–	–	–	–	–	–
Canon LBP 430	–	9	–	–	–	14	–	–	–	–
Canon LBP 860, 1260	–	–	9	–	–	14	–	39	59	99
Epson Action Laser 1100, 1600	–	5	9	–	–	14	–	39	59	–
Epson Action Laser II	–	59	–	89	–	–	119	–	–	–
Epson 8000, 1800, 4000, 4100, 4300	–	59	–	89	–	–	119	–	–	–
Epson 1000, 1500, 5000, 5200	–	–	30	–	–	60	–	–	–	–
HP 2, 2D–	–	–	59	–	–	89	–	–	–	–
HP 3, 3D, 3P, 2P+	–	–	*59*	–	–	*89*	–	–	–	–
HP 4, 4M, 4SI, 4SIMX	–	–	9	–	–	19	–	39	–	–
HP 4L	–	39	–	–	–	–	–	–	–	–
HP 4MP, 4P	–	5	14	–	–	19	–	39	–	–
HP 4+, 4M+, 4V, 4MV	–	5	14	–	–	19	–	39	59	99
HP 5, 5M, 5MP, 5N, 5P, 5SI, 5MX	–	5	14	–	–	19	–	39	59	99
HP 5L, 6L	–	–	–	–	–	49	–	69	–	–
HP 6MP, 6P	–	9	19	–	–	19	–	39	59	99
HP Laser Jet 4000, 5000	–	–	–	–	–	21	–	29	49	109
HP Design Jet 200, 220	–	–	–	–	–	19	–	39	–	–
HP Design Jet 230, 250C	–	–	–	–	–	19	–	39	59	99
HP Design Jet 330, 350C	–	–	–	–	–	19	–	39	59	99
HP Design Jet 600, 650C	–	–	–	–	–	19	–	39	–	–
HP Design Jet 650C PS	–	–	–	–	–	19	–	39	59	99
HP Design Jet 700, 750C, Plus, 755	–	–	–	–	–	19	–	39	59	99
HP Deskjet 500, 500C, 510, 550, 560	29	–	–	–	–	–	–	–	–	–
HP Deskjet 1200C, 1200C/PS, 1600C, 1600CM	–	–	–	–	–	19	–	39	59	99
IBM Laser 4019, 4019E	–	–	–	–	89	–	–	–	–	–
IBM Laser 4029, 4037	–	–	–	–	–	49	–	–	–	–
IBM Laser 4039, 4079	–	–	–	–	–	*29*	–	*39*	–	–
Lexmark, Optra L, LX, R, RX	–	–	–	–	–	19	–	39	59	99
Lexmark Valuwriter 300, 600	–	29	39	–	–	49	–	–	–	–
Lexmark Winwriter 200, 400, 600	–	29	39	–	–	49	–	–	–	–
Lexmark S Series	–	–	–	–	–	–	–	29	59	99
NEC 95, 97	–	–	59	–	–	–	–	–	–	–
Oki 400E, 400EX, 410E, 410EX	–	75	79	105	–	119	–	–	–	–
Oki 810E	–	–	–	–	–	69	–	89	99	149
Oki 600E	–	70	75	–	–	–	97	–	119	–
Oki 610E	–	70	75	87	–	–	97	–	119	–
Panasonic 4420/44501	–	–	84	–	–	109	–	–	–	–
Panasonic 4410/4430	–	–	*64*	–	–	*99*	–	–	–	–
Panasonic 4450	–	49	–	–	–	–	–	–	–	–
Panasonic 4400/5400	–	49	69	–	–	99	–	–	–	–
Panasonic 4440, 5410	–	69	–	–	–	99	–	–	–	–
Panasonic 6500	–	14	14	–	–	29	–	–	–	–
Sharp 9400, 9460, 9600, 9700E	–	49	59	–	–	99	–	–	–	–
Sharp 9500, E, H, 9700, H	–	49	–	–	–	169	–	–	–	–

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Deskpro 450, 4100, 575, 590, 5100, 5133	4/8/16/32Meg	6/19/49/89
Deskpro 575, 5120, 5133, 5150, 5160 (EDD, pairs)	4/8/16/32Meg	6/19/49/79
Deskpro 2000, 4000, 6000 Series (EDO, pairs)	4/8/16/32Meg	6/19/49/79
Deskpro 2000, 4000, MMX (SDRAM)	16/32/64/128Meg	29/49/99/199
Deskpro 6000	16/32/64/128Meg	34/59/109/229
Deskpro 5/60M, 5/66M, XE560 (quads)	4/8/16/32Meg	14/29/59/98
Deskpro XL 6150, 6200 (ECC, pairs)	8/16/32/64/128Meg	Call
Presario 510, 520, 524, 660, 720, 724, 860	4/8/16/32Meg	6/19/49/89
Presario 920, 924, 954, 974, 978, 992	4/8/16/32Meg	6/19/49/89
Presario 2100,2120,2200,3020,3060 (EOD pairs)	4/8/16/32Meg	6/19/49/79
Presario 4112, 4122, 4160, 4402 (EDO pairs)	4/8/16/32Meg	6/19/49/79
Presario 4504, 4508, 4528 (SDRAM)	16/32Meg	34/69
Presario 4704, 4706, 4710, 4712, 4714, 4716 (EDO pairs)	4/8/16/32Meg	6/19/49/79
Presario 4764, 4770, 4784, 4786 (SDRAM)	16/32Meg	34/69
Presario 4808, 4814 (SDRAM)	16/32Meg	34/69
Presario 7170, 7180, 9536, 9546, 9548, 9564 (pairs)	4/8/16/32Meg	6/19/49/89
Presario 9232, 9234, 9240, 9250, 9642, 9660 (pairs)	4/8/16/32Meg	6/19/49/89
Proliant 1000 5/60, 2000, R, 4000, R (quads)	4/8/16/32Meg	14/29/59/98
Proliant 1500, 1500R (pairs)	4/8/16/32Meg	14/29/59/98
Proliant 4500, 4500R (quads)	4/8/16/32/64Meg	9/29/44/69/129
Proliant 5000, 5000R (pairs)	32/64/128/256Meg	Call
Prolinea 575, 590, 5100, 5120, 5133 (pairs)	4/8/16/32Meg	6/19/49/89
Prolinea 5100, 5120, 5133, 5150, 5166 (EDD pairs)	4/8/16/32Meg	6/19/49/79
Prolinea 575E, 100E, 120E, 575MX (pairs)	4/8/16/32Meg	6/19/49/89
Prolinea 590MX, 5120MX (pairs)	4/8/16/32Meg	6/19/49/89
Prolinea 6150E, 6180E (pairs)	8/16/32Meg	29/49/89
Prosignia 300 5/75, 5/90, 5/120, 5/150 (pairs)	4/8/16/32Meg	14/29/59/98
Prosignia 500 5/90, 5/120, 5/150 (pairs)	4/8/16/32Meg	14/29/59/98

COMPAQ NOTEBOOK/LAPTOP MEMORY

MODEL	AMT. UPGRADED	MEMORY PRICE	BATTERY NimH/Li-on
Armada 1100, 1110, 1120T, 1120, 1125	8/16/32/64Meg	14/44/79/139	104/—
Armada 1130, 1130T	8/16/32/64Meg	24/44/79/139	104/—
Armada All 1500 Series	8/16/32/64Meg	24/44/79/139	139/229
Armada1700, 3500, 7400	16/32/64/128Meg	39/79/149/399	—/219
Armada 4100, 41100, 4120T, 4125D (Kit)	8/16/32/64/128Meg Kit	29/49/99/139/279	—/219
Armada 4130T, 4131T, 4150, 4160T (Kit)	8/16/32/64/128Meg Kit	29/49/99/139/279	
Armada 4210T 4220T (Kit)	8/16/32/64/128Meg	29/49/99/139/279	
Armada 6500	32/64/128Meg	79/139/399	
Armada 7300, 7330, 7350, 7360, 7362, 7370, 7380, 7800	16/32/64Meg	44/79/139	—/231
Armada All 7700 Series	16/32/64Meg	44/79/139	—/229
Armada S8 Series 5200, 5231, 5233, 5266	18/32/64Meg	44/79/139	
Armada S8 Series 6233/12T	16/32/64/128Meg	39/79/149/399	
Contura 4/25, 4/25C, 4/25CX	4/8/16Meg	31/44/79	119/—
Contura 400C, 400CX, 410C, 410CX	4/8/16Meg	5/44/74	104/—
Contura 420C, 420CX, 430C, 430CX	4/8/16/24Meg	5/44/74/89	104/—
LTE 5000, 5100, 5200, 5300, 5400 (Kit)	8/16/32/64Meg Kit	3/10/119/229	138/259
Presario 1000, 1010, 1020, 1030, 1070, 1080	8/16/32Meg	39/79/109	110/21

TOSHIBA LAPTOP MEMORY

MODEL	AMT. UPGRADED	MEMORY PRICE	BATTERY NimH/Li-on
Libretto 50CT, 70CT, 100CT	8/16/32Meg	39/69/99	—/161
Tecra 500CDT, CS, 510CDS, CDT, 520CDT, 530CDT	8/16/32/48/64/128Meg	22/44/79/119/139/289	231/239
Tecra 540, 550, 550CDT	8/16/32/64/128Meg	22/44/79/139/289	259—
Tecra 700CS, 700CT (SDRAM)	8/16/32Meg	59/89/149	279/259
Tecra 710CDT, 720CDT, 730CDT, 730XCDT, 740CDT	8/16/32/64/128Meg	39/49/89/149/289	279/259
Tecra 750CDT, CDM, DVD, 780 Series	8/16/32/64Meg	22/44/79/139	
Tecra 8000 Series	32/64/128Meg	79/149/399	
T2100 Series	4/8/16/24Meg	4/29/49/79	104/—
T1900, T4500, T4600, T4700, T4900 All Models	4/8/16/32Meg	33/49/69/119	104/—
T4400, T6400, T6600	16Meg	99	
Satellite T100CS, 105CS, 110CS, 110CT, 115CS	8/16/32Meg	39/59/89	104/—
Satellite 200CDS, 205CDS, 210CS, CT Series	8/16/32Meg	39/59/89	104/—
Satellite 220CDS, 225CDS, 230CX	8/16/32/48/64/128Meg	24/44/79/119/139/289	196/208
Satellite 300, 305, 310, 315, 320, 325, 330, 335 Series	8/16/32/64/128Meg	22/44/79/139/289	196/208
Satellite 2505CDS	16/32/64Meg	44/84/149	
Satellite 4000 Series	32/64/128Meg	79/149/399	
Satellite Pro T400, 405, 410, 415, 420, 425, 430, 435 Series	8/16/32Meg	39/59/89	
Satellite Pro 440CDT, 440CDX, 445, 460CDT	8/16/32/48/64/128Meg	24/44/79/119/139/289	196/208
Satellite Pro 465, 470, 480	8/16/32/48/64/128Meg	24/44/79/119/139/289	196/208
Satellite Pro 490	16/32/64/128Meg	44/79/139/289	
Portege 610CT, 620CT	8/16/32Meg	39/59/89	
Portege 650CT, 660CT	16/32/64Meg	59/89/169	—/210
Portege 7000, 7010	64/128Meg	149/399	

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NOTEBOOK, LAPTOP MEMORY

MODEL	AMT. UPGRADED	MEMORY PRICE	BATTERY NimH/Li-on
ACER Extensa 336/367/366/368	16/32/64Meg	49/89/149	
ACER Extensa 390, 391, 392, 393, 394, 395	16/32/64Meg	49/89/149	
ACERNote 763, 765, 782, 784, 786	4/8/16Meg	19/29/49	
ACERNote Light 356, 358, 359, 361 (pairs) edo	4/8/16Meg	19/29/64 ea	147/—
ACERNote Nuovo 971, 972, 372, 373, 374	8/16/32Meg	29/49/79	
ACERNote Pro 950, 954, 955, 957, 959 (pairs)	4/8/16Meg	19/29/64 ea	
ACER Travelmate		Call	
AST Ascentia A Series and M Series	8/16/32/64Meg	29/49/78/139	154/219
AST Ascentia P30, P50	8/16/32Meg	49/69/129	—/299
AST Ascentia J10, J30, J50 (pairs)	4/8/16/20Meg	19/29/69/89 ea	—/168
AST Ascentia 800N, 810N, 900N, 910N	4/8/16Meg	46/58/79	105, 147/187
AST Ascentia 950N	8/16Meg	59/79	—/187
AST Ascentia M5230 J/M 5260X	16/32/64Meg	49/89/149	
AT&T Globalyst 130	4/8/16Meg	19/29/69	103/—
Canon Innova Book 350CD, 360, 475 (pairs)	8/16Meg	29/69 ea	119/—
Canon Innova Book 480, 490 EDO (pairs)	8/16Meg	29/69 ea	119/—
CTX EZ Book 300 EDO (pairs)	8/16/32Meg	39/69/109 ea	138/—
CTX EZ Book 500, 600 Series	4/8/16Meg	19/29/69	138/—
CTX EZ Book 700, 760, 770 (EDO) (pairs)	4/8/16/32Meg	19/29/69/109 ea	138/—
CTX EZ Book 760MT, 765MT (EDO)	16/32/64Meg	49/89/159 ea	138/—
DEC HiNote Ultra 2000	16/32/64Meg	49/79/139	
DEC HiNote VP 520,525,535,545/150MMX (pairs)	4/8/16Meg	19/29/69 ea	119/259
DEC HiNote VP 5100, 5120	8/16/32/64Meg	29/49/79/149	119/—
DEC HiNote VP, CSS, LSS, CTS, LTS	8/16/32/64Meg	29/49/79/149	119/—
DEC HiNote VP700, 703	16/32/64Meg	49/79/149	
Dell Inspiron 3000, 3200, 7000	16/32/64Meg	49/79/139	—/229
Dell Latitude CP & CPI Series	16/32/64Meg	49/89/149	
Dell Latitude LM, LM P166MMX (pairs)	4/8/16/32Meg	19/29/69/109 ea	—/245
Dell Latitude 433, C, CX	4/16Meg	49/79	119/—
Dell Latitude LX, M	4/8/16Meg	49/59/89	105/—
Dell Latitude XP, XPi, XPi CD M166ST (pairs)	4/8/16/32Meg	19/29/69/109 ea	
Epson ActionNote 650, 650c, 660c, 660cx	4/8/16Meg	9/59/89	119/—
Epson ActionNote 880, 866c, 890, 910	4/8/16/20Meg	19/29/69/99	119/—
Fujitsu Lifebook 400, 500, 600 Series	8/16/32/64Meg	29/59/79/149	103/203
Fujitsu Lifebook 500, 600, 700, 900 Series	16/32/64Meg	49/79/139	103/203
Fujitsu Monte Carlo, Montego, Milan	8/16/32/64Meg	29/49/79/149	—/203
Gateway 2000 Colorbook 4/33	4/16Meg	69/179	112/—
Gateway 2000 Solo Series (pairs)	4/8/16Meg	19/29/69 ea	
Gateway Solo Series 2100, 2200 edo	8/16/32Meg	49/79/179	—/219
Gateway Solo 2300, 2500, 3100, 5100, 9100	16/32/64Meg	49/79/139	
Hitachi C-Series	8/16/32Meg	29/44/139	
Hitachi E-Series, MMX Series	8/16/32Meg	49/69/129	119/219
Hitachi M-Series	8/16/32Meg	49/69/129	104/—
Hitachi Visionbook Elite, Plus, Pro	8/16/32/64Meg	29/49/79/149	154/217
HP Omnibook 800	8/16/32/64Meg	49/79/129/169	—/145
HP Omnibook 2100 PII, 4100	32/64/128Meg	89/169/299	
HP Omnibook 4000C, CT, C	4/8/16Meg	49/54/79	126/—
HP Omnibook 5000CT, CTS, C, 5500CS	8/16/32Meg	54/79/129	126/—
Micron Go Book 233 Lite, 233, 266	16/32/64Meg	49/89/169	
Micron MilleniaTransport Pentium (pairs), MRX	8/16Meg	29/69 ea	
Micron MilleniaTransport VLX P133 (pairs)	4/8/16Meg	19/29/69 ea	
Micron MilleniaTransport XKE P166MMX	16/32/64Meg	49/79/149	
Midwest Micro Elite or Soundbook Plus or Sndbk II, IIP	4/8/16Meg	59/69/129	119/—
Midwest Micro Elite or Soundbook CD	4/8/16Meg	19/29/69	
NEC Ready Notebook 220T, 330T	16/32/64/128Meg	49/89/169/299	133/—
NEC Ultralite Versa, E, V, MP	4/8/16/32Meg	9/44/79/159	133/—
NEC Versa 2600 Series (pairs)	4/8/16Meg	19/29/69 ea	
NEC Versa 4000, 4050/4080, 4200, 4230	4/8/16/20Meg	39/49/79/139	—/219
NEC Versa 6000, 6050, 6030	8/16/32/64Meg	39/79/99/189	
NEC Versa 6200MX edo	8/16/32/64Meg	29/59/79/149	
Packard Bell Statesman	8Meg	69	168/—
Panasonic CF-V41P Series	4/8/16/32Meg	49/59/79/139	126/—
Panasonic CF-62 P100, P133	8/16/32/64Meg	39/59/79/149	
Panasonic Toughbook 25, 35, 45	16/32/64Meg	49/89/149	
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Sharp 3010, 3020, 3050, 3060	4/8/16/32Meg	19/29/59/119	133/—
Sharp 8700, 8800, 8900	4/8/16Meg	49/59/79	124/—
Sharp 9000, 9030, 9020, 9050, 9300CD, T edo	8/16/32Meg	49/69/129	299/252
Sharp 9040, 9070 (pairs)	4/8/16/32Meg	19/29/69/119 ea	—/299
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TI Extensa 450, 450T, 455, 455T	4/8/16Meg	19/29/69	147/—
TI Extensa 510, 515 (pairs) edo	4/8/16Meg	19/29/69 ea	147/—
TI Extensa 550, 555, 560, 565, 570 (pairs)	4/8/16Meg	19/29/69 ea	161/—
TI Extensa 600, 605, 650, 900, T, CDT edo	8/16/32Meg	29/69/89	147/—
TI Extensa 700 Series	16/32/64/128Meg	49/89/169/299	147/—
Winbook FX P100, P133, P150	8/16/32Meg	49/79/119	—/329
Winbook XL, XLI, XL2	16/32/64/128Meg	49/79/149/399	139/219
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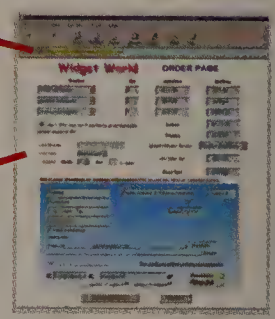

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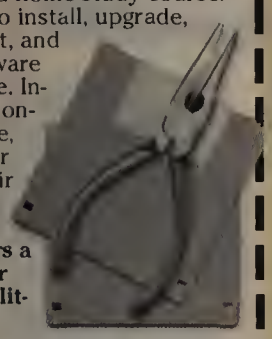

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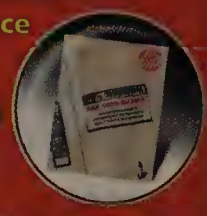

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958 Printers
959 Multimedia products
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plan, for one, isn't sold on their use just yet.

"I'm just not sure that the services that are out there are worth the effort," Kaplan says.

But there are some sure things out there. For example, Boca Raton, Fla.-based HotOffice Technologies Inc.'s virtual office service is business's answer to the high cost of a company intranet. HotOffice gives users "office space" on the Internet where they can communicate and collaborate in a secure environment. All you need is an Internet connection and browser. Web-based E-mail, document management features that let you leave documents online for team members, bulletin boards, online conferencing, and a business center where you can make travel arrangements, are just some of the tools to make "taking it to the road" hassle-free.

THERE'S A NEW GROUP OF MOBILE MANAGERS OUT THERE: THOSE WHO LEAVE THEIR LAPTOPS AT HOME.

EVERYWHERE, AN OFFICE

Other places mobile managers can look to for travel help are the airlines they fly on, the airports they land in, and the hotels they stay in. In the past, business travelers frequently encountered hostile conditions in many hotels, with poor working conditions, small desks, and phones and wall connectors with the wires sealed shut. Now, any business hotel worth its salt is bending over backward to cater to the wired business traveler, with many even offering special configurations like rooms with fax machines, fast Internet connections, and dual-port phones that let you talk and download E-mail at the same time. Some hotels even offer small, up-front "business phone fees," which eliminate the annoying dollar-per-call charges that can quickly add up during a busy day of E-mails.

Many airlines, especially those that cater to business travelers, are revamping their planes to accommodate laptop use, with modem connections to airplane phones and laptop power-source connections located at individual seats. On the ground, airline hospitality clubs have recently been beefing up the services they offer to members. For example, a new business called Laptop Lane has opened outlets in several major airports, offering pay-by-the-hour office spaces complete with high-powered computers, Internet connections, and other office equipment for a much lower price than the annual fees charged by the airline clubs.

So, it's getting easier to stay in touch while on the road, a fact of life that is letting mobile managers like Kaplan keep control over their business while their bodies are 35,000 feet above the ground.

"My staff knows they can always count on me to check E-mail at least twice a day and to stay on top of my voice messages," Kaplan says. "And that's getting a lot easier to do."

LG Electronics

SLIM DOWN FOR THE SUMMER

LG Electronics Inc.'s 800LC LCD monitor has arrived just in time to cool off summer with it's light and space-saving display. The svelte 800LC is perfect for any crowded, busy office where space is more often then not, at a premium. Ever wished you had more room on your desktop? The 800LC's 3-inch thin monitor will make your desk seem miles wide and leave plenty of room for all those family pictures. And now you won't have to squint to see all your windows side-by-side. The monitor features a viewable image size of 18.1 inches, which is larger then most 19" monitors.

The 800LC delivers superlative image quality guaranteed to dazzle with its clarity. The bright colors and ultra sharp display features automatic full-screen size at any displayable resolution up to 1280 x 1024 at 85Hz with 16.7 million colors. If a smaller monitor better meets your needs, the 500LC monitor with its 15.1-inch viewable display is only about 1/2 inch less in viewable size than most 17" monitors and up to 1024 x 768 resolution at 75Hz. At 2.5 inches thick and 12 pounds, this monitor may be the perfect choice for crowded workplace desktops brimming over with work.

MOBILE**MANAGER**

ON THE GO

WHILE MOST MANAGERS WILL TELL YOU THAT THE ROAD IS A LONELY PLACE TO WORK, TODAY'S MOBILE MANAGER TECHNOLOGIES CERTAINLY EASE SOME OF THE PAIN.

LUGGING AROUND A bulky briefcase and laptop through airport after airport is no picnic for business professionals on the go. Twinhead's shoulder saving Slimnote GX notebook, at less than 7.5 pounds and 1.6" thin will take the bulk out of your briefcase and keep one arm from growing longer then the other. Looking for speed? You'll be up and running in a hurry, because the GX boasts a fast Pentium II processor and 6.4 gig hard drive to give you all the speed and space you'll ever need, while the 2X AGP-bus interface, along with 4MB of video RAM sends raw power to your display. So now you can create stunning graphic presentations and documents, or play that game you've been trying to hide at the office all month.

TWINHEAD SLIMNOTE

Later, when you get to your hotel room after a long, harrowing day, only to find you can't log on and get your E-mail because the pop-out connector on your modem broke or you forgot that all important custom cable, you realize you should have bought Xircom Corp.'s RealPort Integrated PC Card. Connectors for network and phone are built right into the card adapter, which fits into the PC slot on your laptop. There are no flimsy connectors to break while your sitting in a hotel room at 11p.m. You can plug standard RJ-45 Ethernet and RJ-11 telephone cords directly into the slots on the card. There is also a telephone handset pass-through that lets you answer calls without removing your modem connection.

XIRCOM PC PLUG

When it's time to make your presentation the next day, you're relieved that you didn't have to drag another 30-pound box around or hassle with shipping your projector to the meeting. At 8.2 pounds, the Sony Corp. VPL-XC50U LCD projector is light, portable and a space saver. Built for rugged, frequent travel, the unit is easy to use and setup quickly, thanks to new preset data memories and Auto Pixel Alignment. The 600 ANSI lumens output clear, bright images so you can WOW your audience with brilliant color. The laser pointer in the Remote Commander gives you control so you can keep your audience directed at what's most important.

SONY LCD PROJECTOR

For the highlight of the presentation, photos taken with the Sony Digital Mavica FD-88 camera keep your audience rapt with attention. This new addition to the Mavica family boasts a 4x high-speed floppy drive, allowing you to capture resolution digital images that are higher than ever before. And you can download them in a reasonable amount of time. The 16x precision digital zoom lens with auto macro gives you close-ups that are sharp and clear in a wide range of conditions. MPEG movie mode lets you dazzle your audience with full motion video and audio. But that's not all. You can then send your video and audio via E-mail attachment by using the E-mail mode, which reduces the image size for Internet use.

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AMD K6-2	333MHz	96MB	10GB	17"	$919.99	(CTQTM26)
AMD K6-2	350MHz	128MB	10GB	17"	$969.99	(CTQTM35)
Intel Pentium II	350MHz	64MB	6.4GB	17"	$979.99	(CTQTM11)
AMD K6-2	450MHz	64MB	6.4GB	15"	$859.99	(CTQTM40)
AMD K6-2	400MHz	128MB	10GB	17"	$1019.99	(CTQTM37)
Intel Pentium II	400MHz	96MB	10GB	17"	$1129.99	(CTQTM12)
AMD K6-3 w/256K cache	400MHz	128MB	12GB	17"	$1219.99	(CTQTM39)
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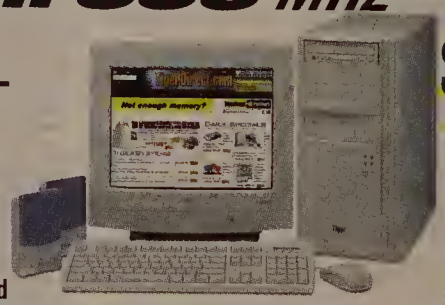

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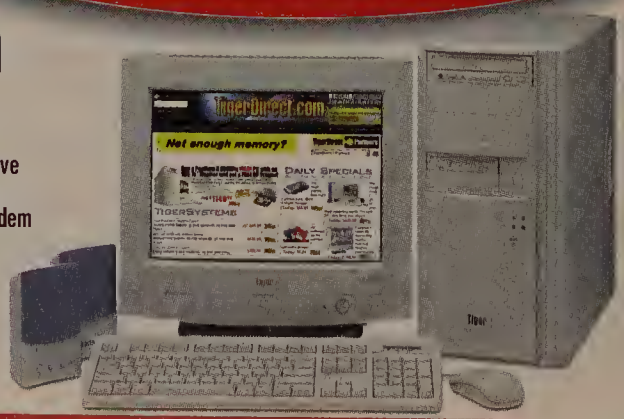

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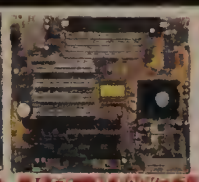
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Tiger 571 Form Factor: **AT** • CPU: **Socket 7** • Bus Speed: **Up to 75 MHz** • OnBoard Video: **PCI 4MB** • On Board Audio: **YES** • PCI Slots: **4** • ISA Slots: **3** • Memory: **2DIMM/4SIMM** • Max Memory: **128/256 MB**

Tiger 598 Form Factor: **AT** • CPU: **Super Socket 7** • Bus Speed: **Up to 100MHz** • OnBoard Video: **AGP 8MB** • On Board Audio: **YES** • PCI Slots: **3** • ISA Slots: **2** • Memory: **3DIMM** • Max Memory: **768 MB**

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571 Pre-Assembled Kits: Motherboard in midtower case, keyboard, speakers, mouse, 56K modem, 1.44MB floppy, 24X CD-ROM. Sound and AGP video card.

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Tiger 6KE LX Form Factor: **ATX** • CPU: **Slot 1** • Bus Speed: **Up to 66 MHz** • PCI Slots: **4** • ISA Slots: **3** • Memory: **3 DIMM Sockets** • Max Memory: **384 MB**
Tiger 6BA+ BX Form Factor: **ATX** • CPU: **Slot 1** • Bus Speed: **Up to 100MHz** • PCI Slots: **5** • ISA Slots: **2** • Memory: **4 DIMM Sockets** • Max Memory: **1024 MB**

Tiger SS7 ATX Super Socket 7

Motherboard & Case: Motherboard mounted in ATX case with 1MB Cache; 235-watt p/s, cables, manual
Pre-Assembled Kits: Motherboard in dual-cooling fan case; keyboard, speakers, mouse, 3D AGP video, 56K modem, 1.44MB floppy drive, 24X CD-ROM, Wave Table sound.

Tiger SS7 Motherboard Features At-A-Glance
Form Factor: **ATX** • CPU: **Socket 7** • Bus Speed: **Up to 100 MHz** • AGP Slots: **1** • PCI Slots: **5** • ISA Slots: **2** • Memory: **3DIMM Sockets** • Max Memory: **768MB**

Tiger 767 AT, 760 ATX Slot 1

AT Slot 1 with 4 PCI/1 ISA

Motherboard & Case: Motherboard mounted in dual-cooling fan case; cables & manual
Pre-Assembled Kits: Motherboard in dual-cooling fan case; keyboard, speakers, mouse, 3D AGP video, 56KFlex faxmodem, 1.44MB floppy, 24X CD-ROM, Wave Table sound.

Micro ATX Slot 1 with 3 PCI/1 ISA

Tiger 767 Form Factor: **AT** • CPU: **Slot 1** • Bus Speed: **Up to 100 MHz** • On Board Video: **8MB AGP** • OnBoard Audio: **YES** • PCI Slots: **4** • ISA Slots: **1** • Memory: **DIMM** • Max Memory: **768 MB**
Tiger 760 Form Factor: **Micro ATX** • CPU: **Slot 1** • Bus Speed: **Up to 100MHz** • On Board Video: **8MB AGP** • On Board Audio: **YES** • PCI Slots: **3** • ISA Slots: **1** • Memory: **DIMM** • Max Memory: **768 MB**

MOTHERBOARD SPECIFICATIONS

Motherboard Design	Processors Supported
Tiger 571 AT including Wave Table sound and PCI video	**AMD** Up to K6-300 & K62-266 **Intel** Pentium up to 233 MMX **IBM/Cyrix** Up to PR300
Tiger 573 AT including Wave Table sound	**AMD** Up to K6-300 &K6-2/266 **IBM/Cyrix** Up to PR300; **Intel** Pentium up to 233 MMX
Tiger 598 AT including 1MB Cache, Wave Table sound and PCI video	**AMD** Up to K6-2/450; K6-3/400 **Intel** Pentium up to 233 MMX **IBM/Cyrix** Up to PR366
Tiger SS7 Super Socket 7 1MB Cache	**AMD** Up to K6-2/450; K63-400 **Intel** Pentium up to 233 MMX **IBM/Cyrix** up to MII 366
Tiger 767 AT Slot 1 with Sound & AGP video	**Celeron** up to 433MHz **Intel** Pentium III up to 500MHz
Tiger 760 Micro-ATX Slot 1 w/Sound & AGP video	**Celeron** up to 433MHz **Intel** Pentium III up to 500MHz
Tiger 6KE LX ATX Slot 1	**Celeron** up to 433MHz **Intel** Pentium III up to 333MHz
Tiger 6BA+ BX ATX Slot 1	**Celeron** up to 433MHz **Intel** Pentium III up to 500MHz

MOTHERBOARD ONLY Item No.	1-2 units	3-5 units	6+ units
MB1-C-1B	$75.99	$70.99	$65.99
MB1-E-8A	$49.99	$44.99	$39.99
MB1-E-9A	$82.99	$79.99	$75.99
MB1-T-7B	$74.99	$72.99	$69.99
MB1-E-5A	$97.99	$95.99	$91.99
MB1-E-6A	$96.99	$94.99	$91.99
MB1-T-10A	$42.99	$40.99	$38.99
MB1-T-9B	$84.99	$82.99	$79.99

MOTHERBOARD & CASE Item No.	1-2 units	3-5 units	6+ units
BB1-C-1B Mid-tower AT case with 200-Watt power supply	$127.99	$124.99	$119.99
BB1-E-8A Mid-tower AT case with 200-Watt power supply	$94.99	$92.99	$89.99
BB1-E-9A Mid-tower AT case with 200-Watt power supply	$139.99	$135.99	$129.99
BB1-C-2D Unassembled—ATX case with 235-Watt power supply & Free Floppy Drive	$149.99	$144.99	$137.99
BB1-E-5A AT Case 200 W Power Supply	$154.99	$150.99	$144.99
BB1-E-6A Micro ATX Case 140W Supply	$139.99	$135.99	$129.99
BB1-T-10A Unassembled—ATX case with 235-Watt power supply & Free Floppy Drive	$109.99	$107.99	$103.99
BB1-T-9A Unassembled—ATX case with 235-Watt power supply & Free Floppy Drive	$149.99	$145.99	$139.99

PRE-ASSEMBLED KITS Item No.	1-2 units	3-5 units	6+ units
KT1-C-1B	$209.99	$203.99	$195.99
KT1-E-8A	$164.99	$161.99	$157.99
KT1-E-11A	$234.99	$226.99	$216.99
KT1-E-2C	$279.99	$272.99	$264.99
KT1-E-5B	$239.99	$235.99	$229.99
KT1-E-6A	$234.99	$227.99	$222.99
Not Available			
KT1-M-7A	$369.99	$362.99	$354.99

See above for Kit components

Power Your Motherboard With A Premium Processor!

AMD K6-3 With 3DNow!

Tiger recommends the Super Socket 7 motherboard with these CPUs

From $47.99

AMD K6-2 Processors	1-2 Units	3-5 Units	6 units or more
#CP2-K6-300 300MHz	$52.99	$49.99	$47.99
#CP2-K62-333 333 3DNow!	$78.99	$73.99	$70.99**
#CP2-K62-350 350 3DNow!	$82.99	$78.99	$75.99*
#CP2-K62-400 400 3DNow!	$122.99	$117.99	$113.99*
#CP2-K62-450 450 3DNow!	$172.99	$164.99	$158.99*
#CP2-K63-400 400 3DNow!	$279.99	$269.99	$258.99*

IBM/Cyrix MII

Tiger recommends the AT motherboard or the Tiger Super Socket 7 motherboard with these processors.

From $37.99

IBM/Cyrix MII	1-2 Units	3 units or more	6 units or more
#CP2-6X300 MII 300 CPU	$42.99	$39.99	$37.99
#CP2-6X333 MII 333 CPU	$58.99	$55.99	$52.99*
#CP2-6X366 MII 366 CPU	$72.99	$69.99	$65.99*

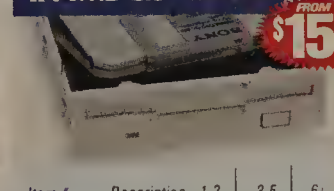
Intel Celeron, Pentium II & III

*** Celeron CPUs are socket 370 format and require a fan and adapter (C183-1000) to be used in any slot 1 motherboard

Intel Celeron, Pentium II & III Processors		1-2 Units	3-5 Units	6 or more
#CP1-CI333	Intel Celeron **333** processor w/fan	$78.99	$75.99	$72.99
#CP1-CI366	Intel Celeron **366** processor***	$75.99	$73.99	$71.99
#CP1-CI400	Intel Celeron **400** processor***	$119.99	$115.99	$109.99
#CP2-P2-350	Intel Pentium II **350** processor*	$189.99	$179.99	$172.99
#CP2-P2-400	Intel Pentium II **400** processor *	$269.99	$258.99	$249.99
#CP2-P2-450	Intel Pentium II **450** processor *	$449.99	$437.99	$419.99
#CP2-P3-450	Intel Pentium III **450** processor *	$469.99	$449.99	$429.99
#CP2-P3-500	Intel Pentium III **500** processor *	$729.99	$699.99	$669.99

1.44MB 3.5" Drives

From $15.99



Item #	Description	1-2	3-5	6+
TC1-6000	Floppy Drive	$19.99	$17.99	$15.99

Cooling Fan SALE!

From $3.49

Protects your CPU against the damging effects of heat!

Item #	Description	1-2	3-5	6+
C183-1000	Socket 7 Fan	$4.99	$3.99	$3.49
C183-1000	Slot 1 Fan	$6.99	$5.49	$4.99
C183-1000	Celeron Fan/Adapter	$13.99	$12.99	$10.99

Supports Socket 7 AMD, Intel, Cyrix/IBM CPUs.

Sorry, but as prices are always changing on CPUs and memory, we do not offer price protection in the event prices rise or fall. *Requires 100MHz bus motherboard and 8ns PC100 SDRAM Memory. ** Requires 95MHz bus motherboard and 8ns PC100 SDRAM.. Call us for details and warranty information. No returns accepted on CPUs.

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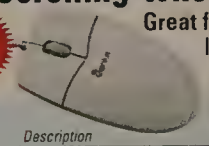


Great for surfin' the Net! Includes software drivers!

Item #	Description	1-2 Units	3-5 Units	6+ Units
TC1-2000	Scrolling-Wheel Mouse	$9.99	$7.99	$6.99

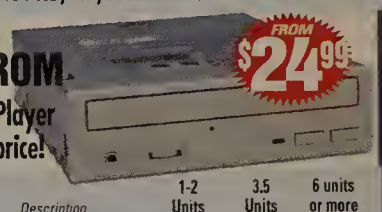
Enhanced Keyboard

FROM $6.99

104 Keys, for Windows/NT

Item #	Description	1-2 Units	3-5 Units	6+ Units
TC1-1000	104-Key Keyboard	$9.99	$7.99	$6.99

24X CD-ROM



FROM $24.99

Great Player Great price!

Item #	Description	1-2 Units	3.5 Units	6 units or more
TC1-4010	24X CD-ROM	$29.99	$27.99	$24.99
TC1-4000	40X CD-ROM	$44.99	$39.99	$37.99

56K PCI Modem Blowout!

Rockwell-Based 56.6K Flex, Fully Compatible PCI Modem With 230K Hyper Modem Feature!

AMQUEST.

FROM $34.99

Item #	Description	1-2 Units	3.5 Units	6+ Units
A109-1032	56k Faxmodem	$39.99	$37.99	$34.99

MEMORY SALE!

FROM $37.99

Item #	Size	1-2	3-5	6+
TC1-MEM-32	32MB PC100 SDRAM	$41.99	$39.99	$37.99
TC1-MEM-64	64MB PC100 SDRAM	$78.99	$76.49	$74.49
TC1-MEM-128	128MB PC100 SDRAM	$159.99	$154.99	$149.99

Note: In order to bring you these low unheard of prices on premium bulk memory, we have negotiated returns for defective exchange only and a 20% restocking charge on all returns with our memory vendor. We will pass these policies on to all retail sales of bulk memory. Call for PNY Branded Memory prices. Prices are subject to change.

Seagate 6.4GB $139.99 HARD DRIVE BLOWOUT!

Item #	Manufacuter	Size	1-2 Units	3+ Units
THD-3A	Seagate	3.2GB	$109.99	$105.99
THD-4A	Seagate	4.3GB	$124.99	$119.99
THD-6C	Seagate	6.4GB	$139.99	$129.99

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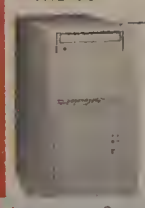

The Tiger AT, ATX, and ATX Server Cases all include a mid-tower, dual-cooling fan design.

Item #	Discription	Units 1-2	3-5	6+
CA1-C-1A	AT Case 9-Bay 200-W P/S	$44.99	$41.99	$41.99
CA1-C-2A	ATX Case 6-Bay 235-W P/S	$58.99	$55.99	$51.99
CA1-M-5A	ATX Server 6-Bay 300-W P/S	$124.99	$119.99	$115.99

So Astounding We Hardly Notice It

OUR CAPACITY FOR astonishment has all but disappeared. Digital wonders have become so routine, we take their magic for granted. The electronic devices we use every day—not just personal computers, but cell phones, CD and DVD players, pocket organizers, and game consoles—are astoundingly complex. But for some reason we firmly refuse to let such things astound us.

This thought came to me after an evening at home looking at DVD movies on a 5-foot-wide screen illuminated by a $3000 InFocus digital projector. It uses an amazing Texas Instruments technology known as Digital Light Processing.

DOING IT WITH MIRRORS

I DON'T USE the term *amazing* lightly. The InFocus system is built around a chip with half a million minuscule mirrors that flip back and forth thousands of times a second. The image reflected off them and onto the screen gets its color from light shining through a rotating wheel segmented into red, blue, and green. And since the mirrors can only be on or off, gradations come from *time-multiplexing;* for each color within each image, the mirrors switch on for longer or shorter passages of time, which the eye and brain interpret as brighter or darker. Yet despite its complexity, the precision ballet of mirrors delivers an extraordinarily stable picture.

Just when **hardware** engineers seem to have run out of **tricks,** they find something better, **cheaper,** faster.

This technology looks particularly magical because of its micromechanical aspect, but others we take for granted are every bit as striking. Modern processors not only make educated guesses about which way a program is headed, but they manage to do it at ever-increasing speeds and ever-decreasing prices. We blithely toss off the phrase "500-megahertz processor" the way our parents might have said "350-horsepower engine," never stopping to think what 500 MHz means: unimaginably tiny circuits in the chip handling hundreds of millions of operations every second.

The continued improvement in disk storage is another form of magic. In the early 1980s, my first outboard unit held a whopping 10 megabytes in a box half the size of my entire IBM PC. Today my three-pound laptop holds more than 4 gigabytes. Just when it seems hardware engineers have run out of tricks, they come up with technology that makes things better, cheaper, faster.

BLINDED BY SOFTWARE

NOTICE THAT I SAID *hardware* engineers. That's because there's often a single barrier between hardware and magic: software. In the systems we use today, there are magical devices that we can't yet take for granted, because we can't figure out how to make them work.

Consider the infrared port. It's been part of virtually every notebook PC for years, but almost no one uses it. Getting two machines' IR ports to acknowledge each other is easy; getting them to do something useful like exchanging files is damnably hard. The culprit: software.

A colleague with a file I needed was recently sitting next to me during a boring presentation. We had virtually identical subnotebook machines with us, and mine was already set up to transfer files via IR. But installing and configuring the Windows plumbing on my colleague's machine took several reboots and about 20 minutes, and that was only because I'd done it before.

The IR port isn't the only cool hardware that bad software—much of it Microsoft's—has managed to sabotage or delay. Microsoft was supposedly a big booster of CD-ROM in the mid-1980s, but in those days of limited memory resources its driver was about as big as the rest of the operating system. And until recently, the USB ports built into most desktops were largely unusable, thanks to lackluster OS support.

Microsoft's hardly the only culprit. Vendors of otherwise wonderful video cards often shoot themselves in the foot by delivering drivers that just plain don't do their job. And DVD-ROM decoding software has been a constant annoyance.

But when this stuff works, it does so in ways most of us can't begin to fathom. That engineers have made the astonishing routine may well be their most astounding trick of all.

PC World *Contributing Editor Stephen Manes is the cohost of* Digital Duo, *a new program on public television stations nationwide. He is coauthor of* Gates, *a biography of Microsoft's chairman.* ■

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- 100MB Iomega Zip BUILT-IN Drive
- MS IntelliMouse
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- 16MB Diamond Viper TNT 3D AGP Graphics Card
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- ACS-340 Speakers with Subwoofer
- 100MB Iomega Zip BUILT-IN Drive
- MS IntelliMouse
- **Power Game Pack[22]**

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- harman/kardon HK-195 Speakers
- MS IntelliMouse
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- 15" (13.8" vis) 800F Monitor
- ATI 8MB 3D AGP Graphics
- 32X Max[6] Variable CD-ROM Drive
- Yamaha XG 64V Wavetable Sound
- harman/kardon HK-195 Speakers
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- ★ ***Dell-Recommended Upgrade, add only $179.*** *64MB SDRAM, ACS-340 Speakers with Subwoofer, 100MB Iomega Zip BUILT-IN Drive*

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Personal Lease[16]: $39/Mo., 36 Mos.

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S Office 97 SBE (Ask about Our *FREE* S Office 2000 Upgrade Offer)
crosoft Windows 98
'C SurgeArrest Pnote Pro

3799

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E•VALUE CODE: 03628-890537

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PENTIUM II PROCESSOR AT 366MHz

Desktop Features, Notebook Convenience

- 14.1" XGA Active Matrix Display
- 64MB SDRAM
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$2799

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PENTIUM II PROCESSOR AT 300PE MHz

Light Weight, Light Price

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- 32MB SDRAM
- 4.3GB[4] Ultra ATA Hard Drive
- Modular 24X Max[7] Variable CD-ROM
- NeoMagic® MediaMagic 256AV AGP Video
- Microsoft Works Suite 99 with Money 99 Basic
- Microsoft Windows 98
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$1999

Business Lease[15]: $67/Mo., 36 Mos.
E•VALUE CODE: 03628-890519

NEW DELL INSPIRON 3500 C333XT
INTEL CELERON PROCESSOR AT 333MHz

Light Weight, Light Price

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- 32MB SDRAM
- 4.3GB[4] Ultra ATA Hard Drive
- Modular 24X Max[7] Variable CD-ROM
- NeoMagic MediaMagic 256AV AGP Video
- Microsoft Works Suite 99 with Money 99 Basic
- Microsoft Windows 98
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- ★ *APC SurgeArrest Pnote Pro, add $29.*

$1799

Business Lease[15]: $60/Mo., 36 Mos.
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- Microsoft® Office 97 Small Business Edition plus Bookshelf Basics 99 (Ask about Our *FREE* Office 2000 Upgrade Offer); McAfee VirusScan
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- Dell QuietKey® Keyboard
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